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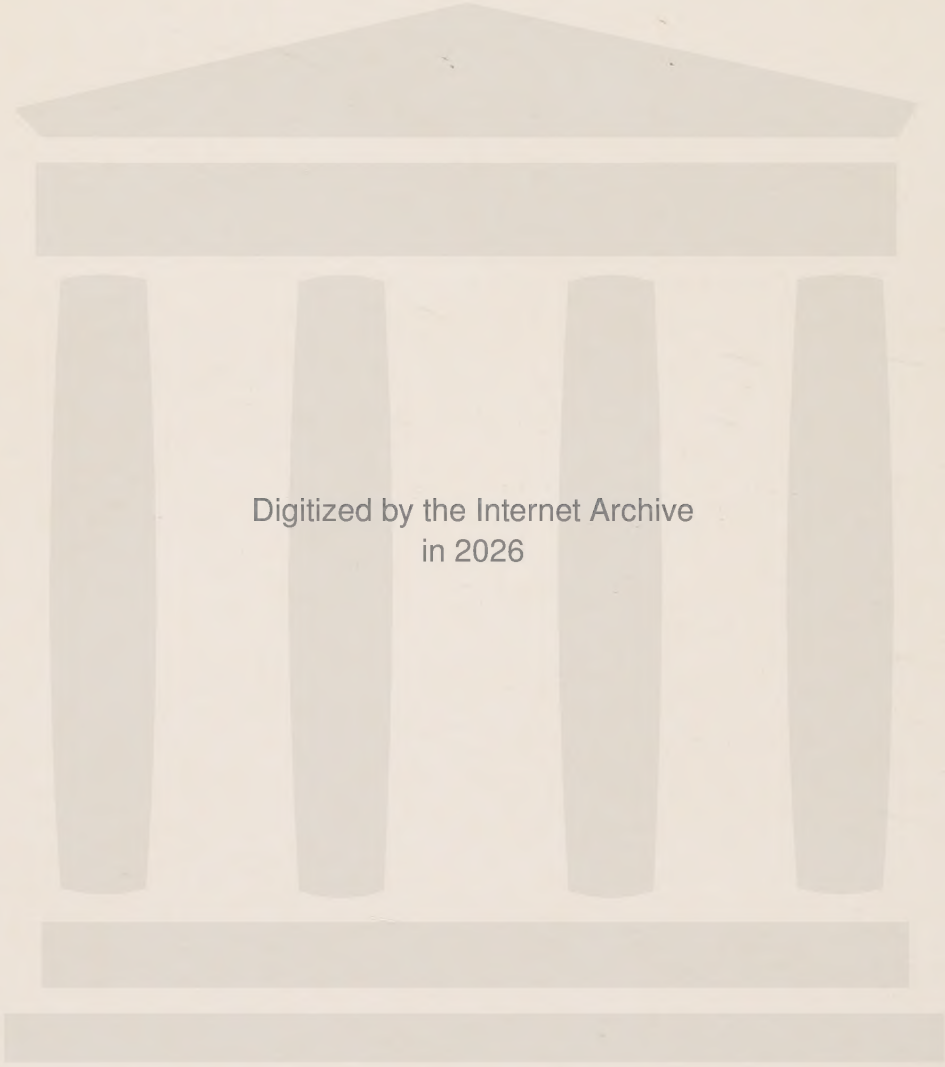
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Republic of South Africa
Department of Environment Affairs
SEA FISHERIES

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The text was compiled by the editor from contributions by the relevant Directorates, Subdirectorates and Divisions of Sea Fisheries based largely on statistics and information rendered by the fishing industry.

MISSION OF SEA FISHERIES

To ensure effective protection and sustainable use of the living resources and ecosystems of the sea around the Republic of South Africa, Sea Fisheries of the Department of Environment Affairs undertakes and supports applicable research in order to provide the best possible advice on resource utilization and protection

- *maintains effective administration of sea fisheries matters, and*
- *promotes sea fisheries development and policy in consultation with interest groups*

EDITORIAL NOTE

This series, South African Commercial Fisheries Review, *and its companion series*, Research Highlights of the Sea Fisheries Research Institute, South Africa, *have replaced the series* Annual Report of the Chief Directorate Sea Fisheries *and its predecessors.*

This Review aims to present the official statistics on the catches, production and monitoring of the South African commercial marine fisheries and to document changes in exploited stocks, in fishing, processing and marketing practices and in fisheries management and legislative measures. More detailed treatment of specific aspects can be found in the research series of the Sea Fisheries Research Institute and the international scientific literature.

1. INTRODUCTION

THE year under review has been an exciting one — a year characterized by both uncertainty and hope for the future. The developments in South Africa provide enormous challenges and opportunities for Sea Fisheries and its Research Institute.

A committee, appointed by the Director-General during 1992 to investigate the guidelines for the allocation of quotas and related matters, tabled its report to the Quota Board on 9 December 1992. The new guidelines were approved by the Minister of Environment Affairs on 10 March 1993 and contained a preamble articulating the objectives of the Board and, apart from being more comprehensive, embodied a specific clause to facilitate the establishment of community trusts.

The Board resolved to abolish the measure which guarantees foundation members in the trawling industry 80% of any increase in the Total Allowable Catch (*TAC*) of hake and pegged their quotas at the levels they had attained at a *TAC* of 141 000 t of hake. Any increase in the *TAC* may in future be used to assist small quota-holders, establish community trusts in fishing communities or admit new entrants. When the hake *TAC* exceeds 152 000 t, foundation members may again share in 50% of any *TAC* increase.

The committee made specific recommendations for the establishment of a number of community trusts which could share in a quantity of hake set aside for this purpose in 1993. In practice it was found that aspects such as the identification of communities to share in the reserved fish allocation and of the beneficiaries, as well as the registration and running of such trusts and the method of distributing the funds generated, posed major problems. At the end of 1993 the Department still had to attend to some problems related to these trusts and it is likely that they will only become fully functional in 1994.

The structural and strategic changes implemented a few years ago fortunately enable Sea Fisheries to adapt to a new operating environment so that it can make a meaningful contribution to the furtherance of the aims of an expected government of national unity. Moreover, various new research initiatives formulated by the Institute in partnership with a broad cross-section of the South African marine science community will ensure that resource-related research becomes even more relevant to the needs of a changing society. The research fleet was also considerably strengthened by the commissioning in July 1993, after a major conversion programme costing approximately R6,5 million, of the French trawler *Ludovic Jego* acquired in November 1991. The vessel was renamed *Algoa* at a ceremony in Table Bay Docks in October 1993.

The total nominal South African commercial catch of 608 587 t was 15% lower than in 1992, which had been the third best year since 1975. However, the 1993 catch was still well above 1990 and 1991, the two worst years in this period, with an average catch of 520 682 t. The main reason for the lower catch in 1993 was the decrease of 111 922 t in the anchovy caught. The catch was 124 170 t below the anchovy *TAC* as a result of the poor availability of recruits.

The catch of the second largest sector, the demersal, was 2% lower although that of hake, its largest component, was higher as a result of a moderately increased *TAC*. The decrease was mainly due to less horse mackerel being caught in the demersal fisheries.

The only sizable sectors that improved their performance in 1993 were squid-jigging (144% up) and the mullet and St Joseph fisheries (47% up).

Despite the lower total catch, the overall potential wholesale value of fish and products

was marginally higher (0,4% up) at R1 191 million. This means that, in general, better prices were obtained than in 1992. However, 1992 had been the first year since 1986 that the annual rise in total value had been interrupted, 1991 being the peak year at R1 310 million, and prices had been under pressure in 1992. Most sectors reported better prices in 1993, abalone and squid doing particularly well on export markets. Mussel-farming, a small but valuable activity, had a poor year, production being down and prices lower because of keen competition among producers.

Good progress has been made with the development of a multispecies approach for the management of pelagic fish. Modified management procedures for anchovy *Engraulis capensis* and pilchard (sardine) *Sardinops sagax* will be implemented with effect from January 1994 and hopefully will facilitate more responsive management of the main pelagic species.

One of the major challenges during the year under review has been the development of an appropriate research programme to assess the resource-related biological and socio-economic consequences of commercially longlining the Cape hakes *Merluccius capensis* and *M. paradoxus*. Central to this research is the selectivity patterns of the trawl as opposed to longline fisheries.

The growth and production rates of West Coast rock lobster *Jasus lalandii* were again low during 1993. This remains a major source for concern. Model simulations show that current levels of harvesting cannot be sustained unless growth rates improve. The precise cause of the low growth increments remains elusive and poses an urgent research challenge, the outcome of which could influence future management of the resource significantly.

Telephone surveys by a market research company under contract to Sea Fisheries estimated that 470 t of rock lobster were taken recreationally in 1992/93 in comparison with 160 t in 1991/92. Admittedly, some 27% was caught between Hangklip and Gans Bay and another 23% between Hout Bay and Cape Point, which are not areas where intense commercial fishing takes place, and the recreational catch does not form as large a proportion of the commercial *TAC* as in the case of abalone, but the pressure on the already depleted stock of West Coast rock lobster is increasing. As a result of the lowering of the minimum size limit from 89 mm to 80 mm carapace length and the three months longer season for recreational fishermen, the reported average catch was 23 lobsters per person per season in 1992/93 compared with 10 in 1991/92.

The telephone survey also showed that recreational divers took an estimated 495 t of abalone during the 1992/93 season, 34% more than during 1991/92, 181 t being derived from non-commercial fishing grounds. However, there are two islands where recreational diving is not allowed, so that in those areas where both recreational and commercial fishermen are active, the recreational take was some 57% of the commercial *TAC*. Besides the effect of poaching, the pressure on this limited resource is therefore mounting. There is growing urgency to decide how such a resource with multiple users should be managed in future.

* * *

2. THE FISHERY AS A WHOLE

2.1 Total catch

THE total nominal South African commercial catch of 608 587 t was 15% lower than in 1992 (Table I), which had been the third best year since 1975. It was still well above 1990 and 1991, the two worst years in this period, with an average catch of 520 682 t. The main reason for the lower catch in 1993 was the decrease of 111 922 t in the anchovy catch, which was 124 170 t below the *TAC*.

Table I: Total nominal catch and catch per sector of the South African commercial sea fisheries (Walvis Bay, Moçambique and foreign fleets excluded)

Fishery sector	Nominal catch (t)	
	1992 1991/92	1993 1992/93
Seaweeds (wet mass)	15 178	7 826
Bait organisms	1	11
Mussels and oysters farmed/ fattened	2 440	2 240
Picked oysters and marketable wash-ups	65	50
Abalone	587	603
Whelks and crabs	2	2
Limpets	0,4	–
Horse mussel	–	1
Prawns farmed	–	35
Rock-lobster fisheries		
West Coast	2 483	2 177
South Coast	924*	1 025
Subtotal rock lobster	3 407*	3 202
Crustacean trawl	590	554
Pelagic fisheries	452 705	357 040
Line fisheries		
Tuna	6 486*	4 903
Squid-jigging	2 588	6 308
Handline fishery	12 555*	9 026
Subtotal line-fish	21 629*	20 237
Harder and St Joseph fishery	1 193	1 748
Demersal fisheries		
Offshore	184 855	190 000
Inshore	17 849	15 233
Midwater	10 772	6 350
West Coast sole	338	90
West Coast gurnard	81	210
Offal (trash fish)	4 381	2 512
Subtotal demersal	218 276	214 395
Guano	515	643
Total	716 588*	608 587

* Updated

The catch of the second largest sector, the demersal, was 2% lower although that of hake, its largest component, was higher as a result of a moderately increased *TAC*. The decrease was mainly due to less horse mackerel, the second largest contributor to demersal landings, being caught in trawls, but landings of two other major contributors, buttersnoek and monk, were also down on 1992.

Despite lower landings by the pelagic and demersal fisheries in 1993 their combined contribution to the total catch has remained unchanged at 94% for the past two years.

The only sizable sectors that improved their performance in 1993 were the squid-jigging (144% up) and the mullet and St Joseph fisheries (47% up).

The other linefisheries, pole-fishing for tuna and handlining, performed less well in 1993, being 24% and 28% down respectively. Snoek, the most important handline species was about half the 1992 catch of 5 651 t, but the bottom-trawled catches of snoek were similar in 1992 and 1993 at some 12 500 t.

Seaweeds in 1993 contributed about half of the 15 178 t reported for 1992, less kelp being collected as beach-cast because of the poor demand on the export markets.

More details of particular fishery sectors and stocks are given elsewhere in this review and in the companion publication *Research Highlights* **3**.

The latest international figures with which the South African performance can be compared are for 1992. The world marine catch peaked in 1989 at some 86 million tons and has subsequently fluctuated between 82 and 83 million tons. South Africa ranked 29th and 31st as a

marine fishing nation in 1990 and 1991 respectively, but the good catch of 1992 elevated it to 22nd position. South Africa is one of a group of about a dozen medium-sized fishing nations with a regular annual catch of between 500 000 t and a million tons in recent years.

The only other African country in this group is Morocco, which has reported catches (mostly of European pilchard) of between 420 000 and 562 000 t in the past decade. She fishes in one of Africa's three major upwelling areas, namely off North-West Africa, the other two being the northern and the southern Benguela. However, the yield from that upwelling system is much higher (1–2 million tons) and fleets from Spain, Portugal, Mauritania, Japan, the Korean Republic and former East Block countries make substantial catches there.

Another major African upwelling area, the northern Benguela off Namibia, has yielded less in recent years, partly because of the state of the stocks and partly because of the curtailment of foreign fishing since Namibian independence in 1990. Catches by Namibia (mainly pelagic shoaling fish) have ranged from 204 000 to 293 000 t since independence. Foreign catches off the northern Benguela (mostly of horse mackerel and hake) by Eastern Block countries and Spain have dropped from some 950 000 t in 1989 to 417 000 t in 1992.

In the southern Benguela upwelling system, off the Western Cape, South Africa has virtually been the sole participant since November 1977 when a fishing zone of 200 nautical miles was declared. However, Japanese pelagic longliners (90 in recent years) have been permitted to catch yellowfin tuna inside the fishing zone in the Indian Ocean and Taiwanese longliners (30 in recent years) albacore (longfin) inside the South African zone in the Atlantic. The moderate quotas awarded to foreign countries and altogether phased out since 1993 were mostly caught in the Indian Ocean and not in the Benguela system.

2.2 The information base

THE catch figures presented are in the main quite accurate, being a summation of the monthly landings reported by each company in each fisheries sector, a statutory requirement. In the fisheries controlled by *TAC*s, landings usually pass over scales that in some cases are supervised by Marine Conservation Inspectors of the Cape Provincial Administration. For some fisheries in which the catch is not always landed in the whole (round) state, particularly the demersal fisheries, landings have been converted to nominal catch by the use of scientifically determined conversion factors based on the degree of processing on board by the various fishing concerns. For some smaller fisheries for which numbers only are reported (e.g. the mullet and oyster sectors), a conversion to mass has been made using the best available information.

The monetary values presented in Table II are rather an estimate, not based on a summation of sales of various commodities by companies throughout the year but on average prices realized as provided by companies consulted in this regard. However, the production figures presented throughout this report and which form one component in calculating values are mostly regarded as quite accurate. The problem arising from a great variety of product lines produced by different companies is particularly acute in the demersal sector, the most valuable of them all.

The value at landing or at first sale is also problematical in those fisheries where the landed fish is either not caught by independent fishermen or not sold to a second party. Because of vertical integration in some fishery sectors and the provision of fuel and gear to fishermen, value at landing is often simply calculated for accounting purposes.

2.3 Monetary value of catches and products

BECAUSE of the problematical nature of the landed value in some fisheries alluded to in the previous section, the following discussion concerns only the wholesale values.

Despite the lower catch overall and in most sectors in 1993, the total potential wholesale value of fish and products was marginally higher (0,4% up) at R1 191 million (Table II). This means that, in general, better prices were realized than in 1992. However, 1992 had been the first year since 1986 that the annual rise in total value had been interrupted, 1991 being the peak year at R1 310 million, and prices had been under pressure in 1992. The overall wholesale value per ton landed had been R1 656 in 1992 but improved to R1 958 in 1993.

Most sectors reported better prices in 1993, abalone and squid performing particularly well on export markets, earning 22% and 169% more respectively. Abalone landings are limited by a near constant *TAC*, but squid landings were 144% up on 1992. The mullet and St Joseph fishery reported catches 47% higher and obtained 53% more for them.

Mussel-farming, a small but valuable activity, had a poor year, production being down and prices lower because of keen competi-

Table II: Estimated values of landings and products of the various South African commercial fisheries (Walvis Bay and Moçambique excluded*)

Fishery sector	Value (R million)			
	Landed 1st sale		F.O.B. wholesale (processed)	
	1992	1993	1992	1993
Seaweeds	2,200	1,158	3,730	2,819
Mussels and oysters farmed			12,470	9,481†
Oysters collected	0,298	0,186	0,691	0,408
Abalone	7,230	9,016	26,847	32,777
Rock-lobster fisheries				
West Coast	49,660	47,872	89,022	83,915
South Coast	39,040	44,325	45,900	54,355
Subtotal rock lobster	88,700	92,197	134,922	138,270
Crustacean trawl	10,412	11,016	12,095	12,667
Pelagic fishery (bait included)	90,216	71,088	262,576	232,134
Linefisheries				
Tuna pole fishery	33,901	21,399	40,071	30,760
Squid-jigging	11,646	36,271	24,586	66,234
Handline fishery	38,877*	35,552	57,402	48,124
Subtotal linefish	84,424*	93,222	122,059	145,118
Mullet and St Joseph fishery	1,298	2,311	2,089	3,197
Demersal fisheries				
Offshore and Midwater		287,929	557,421	570,373
Inshore		23,397	51,110	43,455
Subtotal demersal fish		250,833	608,531	613,828
Guano	0,335	0,480	0,446	0,637
Total		531,507	1 186,456*	1 191,336

* Updated
† Cultivated prawns are included in 1993
N.B.: R1 = ± $(U.S.) × 0,28 in mid 1994

Table III: Licensed South African commercial fishing vessels in the fisheries zone of the Republic on the last day (30 June) of the licensing years 1992/93, 1991/92 and 1990/91 (as at January 1995)*

Registration area	Registration letters	≤ 4,99 m	5–7,99 m	8–11,99 m	12–19,99 m	20–24,99 m	> 25 m	Regional totals
Walvis Bay	WB	5	14	–	–	1	–	20
Port Nolloth	PNA	130	–	2	7	–	–	139
Hondeklip Bay	HB	42	–	–	5	–	–	47
Vredendal District (including Doring Bay)	VR	115	1	1	8	–	–	125
Lambert's Bay	ADF	200	19	34	9	9	–	271
Piketberg District (including Elands Bay and Velddrif)	PQ	322	39	3	2	11	2	379
Saldanha Bay area	SBH	179	63	8	8	12	23	293
Vredenburg District (including Paternoster and St Helena Bay)	SH	313	56	27	17	21	5	439
Table Bay area (including Bok Bay and Yzerfontein)	CT	72	158	1	–	–	–	231
Cape Town Harbour	CTA	–	–	6	78	15	73	172
Hout Bay	HTB	8	9	15	77	22	3	134
Simonstown Harbour	STH	2	4	9	4	–	–	19
Simonstown area (including Cape Point and False Bay areas)	ST	121	157	1	–	–	–	279
Kalk Bay	KB	5	21	37	7	–	–	70
Somerset West District (including Gordon's Bay)	SW	48	135	9	3	–	–	195
Caledon and Hermanus Districts (including Hawston)	C	66	47	–	2	1	–	116
Gans Bay (including Klein Bay and Pearly Beach)	DDF	62	49	–	6	7	–	124
Bredasdorp District (including Waenhuiskrans and Struis Bay)	BR	35	120	24	–	–	–	179
Heidelberg District (including Witsand and Infanta)	SM	6	19	–	–	–	–	25
Riversdale District (including Still Bay and Puntjie)	R	34	92	1	–	–	–	127
Mossel Bay	MBA	–	8	11	8	22	2	51
George District	G	3	7	–	–	–	–	10
Knysna District (including Plettenberg Bay)	KN	3	27	3	3	–	–	36
Humansdorp District (including Jeffreys Bay and Oyster Bay)	H	6	113	18	12	–	–	149
Port Elizabeth area	PEA	4	39	12	49	11	6	121
Port Alfred District	P	2	85	3	–	–	–	90
East London area	ELA	1	21	2	1	–	–	25
Durban area	DNA	–	5	10	7	4	13	39
Natal coast	N	11	178	4	–	–	–	193
Total (1992/93)		1 795	1 486	241	313	136	131‡	4 102‡
Total (1991/92)		1 772	1 372	233	318	134	129‡	3 958‡
Total (1990/91)		1 781	1 351	230	319	138	130‡	3 949‡

* The figures presented are not comparable with those given in previous Reviews because they now reflect the position at the end of the licensing year instead of for the full year from 1 July to 30 June

‡ Includes 4 vessels not registered in South Africa in 1993 and 5 in 1991/92 and in 1990/91

tion among producers. The lower tuna catch (24% down) was not compensated for by higher prices because the wholesale value dropped by 23%. In the pelagic fishery, the second most valuable at 19,5% of the overall value of the South African fishery in 1993, the lower landings (21% down) were partly compensated for by better earnings because the wholesale value of products decreased by only 11,6%. In the handline fishery the situation was the same in that catches were 28% lower, but the value only 16% less.

The most valuable fishery sector, the demersal, contributing 51,5% of total value in 1993 (51,3% in 1992), maintained its earnings from landings 2% lower. However, the demersal wholesale value in 1992 had been 19,5% lower than in 1991, the peak year, and even lower than in 1990. The situation therefore remained unchanged in 1993, the value being still 18,8% below that of 1991. Taking inflation into account, earnings in real terms were even lower. Since a substantial part of demersal earnings are derived from exports and the exchange rates have been favourable it must be concluded that prices realized on export markets were under pressure.

2.4 The South African commercial fishing fleet

THE licensed South African commercial fishing fleet, numbering 3 950–4 100 between 1990/91 and 1992/93 (Table III), includes some 80% of craft smaller than 8m (dinghies, skiboats and catamarans) used mainly in the fisheries for rock lobster and mullet on the West Coast, but also to a considerable extent in the handline and squid-jigging fisheries on the South and East Coast. The others are larger vessels (decked motor boats, purse-seiners and trawlers) used mainly in the fisheries for pelagic and demersal fish, Natal crustaceans and South Coast rock lobster although some motor boats are also active in those fishery sectors employing mostly smaller craft. The largest vessels licensed in South Africa are two factory-freezer stern trawlers of 90 m (2 405 GRT) operating out of Cape Town. In addition to being licensed as fishing vessels, 73 of the larger vessels were also licensed as factories in the calendar year 1993 (57 in 1992 and 64 in 1991). The bulk of these factory vessels is used in the squid fishery (see Table VIII), most of the rest being trawlers.

The following discussion is limited to boat numbers and sizes licensed around the coast. Licensed vessels also have to renew their permits for the fishery sectors in which they are approved participants for the various permit years applying to fishery sectors. The fleets permitted in the various fishery sectors will be discussed for those for which computerized information is available in the chapters on those fisheries. Permit information is at present available for handlining, squid-jigging, purse-seining and crustacean trawling. Being in possession of a valid licence and permits does not mean that a vessel has fished at all.

The basis on which fleet particulars are presented in Table III has changed, with the result that the figures presented are not comparable with those in previous Reviews, but there has been no change in the trends shown. The present figures represent valid licences at the end of the licensing year 1 July to 30 June, and vessels withdrawn since the report year are restored for the analysis. Previous Reviews listed all licences in a licence year but, because a new licence (and usually permits) is issued when a vessel is sold, resulting in a double count, the figures presented gave an inflated number of boats. A computer program has not yet been written to restore vessels that changed their registration area since the report year to their

appropriate areas. The movements of vessels along the coast are therefore masked to some extent by the fact that they are listed where they were when the computer summary was made. The more recent summaries would be least affected by this. Apart from this, registration area must in many cases be regarded as homeport because vessels fish on grounds remote from it, *e.g.* most tuna pole-fishers and South Coast rock-lobster trap-fishers are registered in the Cape Peninsula.

The overall fleet has been growing, by 0,2% from 1990/91 to 1991/92 and by 3,6% from 1991/92 to 1992/93 (Table III). These have been the first increases since the fleet had peaked at 7 816 in 1969. The increases since 1990/91 have been due to more craft in the three licence categories smaller than 12 m, whereas the number of vessels larger than that has remained constant or decreased marginally. Apart from a decrease in the number of vessels smaller than 5 m in 1991/92, the increases have been consistent in the three smallest length categories. The greatest increase has been in the group 5–7,99 m (35 more). If this group is roughly equated with the old skiboat and motor skiboat categories the trend is consistent in that this has been the only group to have grown year by year, from 858 craft in 1980.

However, there were regional differences in the trends. In the smallest length category there were 22 more craft on the West Coast (PNA–HTB) in 1992/93 than in 1990/91 and on the East Coast (SM–N) 20 more, but along the South-West Coast (STH–BR) there were 29 fewer. In the next larger category, there were 12 fewer on the West Coast (PNA–HTB) than in 1990/91, but on the coast to the east of that there were consistently more, 137 more in total.

The net effects of these trends were that the number of vessels on the geographical West Coast (PNA–BR) remained virtually constant (3 212 in 1992/93 and 3 215 in 1990/91), but on the East Coast (SM–N) it increased from 720 to 866. The increase on the Cape South Coast (SM–PEA) was 68 vessels, on the Cape East Coast (P and ELA) 22 and in Natal 56. It must be borne in mind that these increases are minimum figures because of the masking effect caused by the problem with registration areas mentioned before. As a percentage, the West Coast had 81% of the vessels in 1990/91 and 78% in 1992/93. The decreasing trend on the West Coast has been persisting since at least 1986 when 86% of the total fleet was registered there.

At first sight the growth of the fishing fleet seems puzzling because the only remaining fishery with open access has been that for tuna, and the number of vessels with a T-permit only has remained constant since 1990/91 (see Table XIX). Boat limitation is not applied in the fisheries using larger vessels, but there has been no growth in their fleets (Table III). The growth in the overall fleet has been confined to craft smaller than 12 m, and various factors could influence their numbers. A boat can be licensed without having a permit for any fishery, but there is no real incentive for a boat-owner to do so. In the fishery for West Coast rock lobster varying numbers of dinghies are deployed depending on fishing conditions. Although there has been a large drop in dinghy numbers from 3 774 in 1980, there has been an increase on the northern West Coast of 24 since 1990/91. N-permits for dinghies in use in the mullet and St Joseph fisheries, predominantly on the West Coast, have been dispensed with since 1990/91 because they were difficult to enforce: some beach-netters do not use dinghies at all and others use unlicensed craft or dinghies with permits for other fisheries, either their own or borrowed. In 1988 there were 157 dinghies with an N-permit only, the remainder having other permits which they

presumably retained when N-permits were abolished.

Boat limitation has been applied in the linefishery since 1985 and in the squid-jigging fishery since 1987. However, permits for these fisheries became freely transferable when the new Sea Fishery Act came into effect on 1 July 1990, whereas previously they were coupled to a particular vessel. The main instrument for controlling fishing effort has become the limitation of the number of crew carried by a vessel. It therefore became possible to split crew and permits of a larger vessel between two smaller vessels or to consolidate those of two smaller vessels on one larger vessel, leading to changes in the size of the fleet. The increase in craft smaller than 12 m since 1990/91 seems to be largely due to splits between vessels prompted *inter alia* by poor squid catches in 1992 and a switch of squid craft to linefishing and a shift to Natal.

The pressure being put on the limited linefish stocks off Natal by the events described led to further control measures that will curb future expansion of the fishing fleet. From mid 1992 a ban was placed on the transfer of linefishing vessels from the Cape to Natal and in November a Ministerial decision prohibited the transfer of commercial (A) linefishing permits except to *bona fide* commercial fishermen and then only with the permission of the Chief Director of Sea Fisheries. Furthermore, permit-holders were informed at the start of the 1992/93 licensing year that existing tuna permits would be renewed, but that new ones would not be issued because holders of A (commercial) and B (semi-commercial) linefishing permits are entitled to catch tuna and do not need a special permit.

* * *

3. FISHERY SECTORS

3.1 Seaweeds

SIX species of Cape seaweeds have continued to form the basis of a modest but viable commercial industry. Exploitation is controlled by the Department of Environment Affairs by means of a system of 17 Concession Areas along the Cape coast (see the previous Review for a map). Each area has a single permit-holder, who may collect or harvest particular species according to the permit conditions. In some places, where the effects are still being studied by scientists of the Sea Fisheries Research Institute, harvesting is allowed on an experimental basis only .

In 1992, stocks of the agar-producing red seaweed *Gracilaria* began recovering at Saldanha Bay, where they had collapsed in 1988. The 1993 yield reached nearly 400 t (Area 17 in Table IV), which was about the same amount obtained before the collapse in 1988, and the resource appears healthy again. *Gracilaria* wash-ups have been recorded north of Laaiplek in St Helena Bay since at least 1969, but only since 1992 have regular commercial collections been made there (Area 12 in Table IV). Diving surveys by scientists from the Institute have shown that the biomass of the local source population varies seasonally: after winter wash-ups there is a slow recovery through to the following autumn.

Harvesting of several *Gelidium* species (mainly *G. pristoides*) continues in the eastern

Drying red seaweed *Gracilaria* at Saldanha Bay for export

Table IV: Seaweeds gathered and exported

Concession area (C A.)	Kelp: Mixed *Ecklonia maxima* and *Laminaria* spp.		*Gelidium* spp.		*Gracilaria verrucosa*		Total	
	1992	1993	1992	1993	1992	1993	1992	1993
				Gathered (kg dry mass)				
1	–	–	91 834	86 125	–	–	91 834	86 125
2–4	–	–	1 860	–	–	–	1 860	–
5–8	260 894	10 144	–	–	–	–	260 894	10 144
9	421	9 050	–	–	–	–	421	9 050
10	–	–	–	–	–	–	–	–
11	–	20 000	–	–	–	–	–	20 000
12	–	–	–	–	86 200	60 000	86 200	60 000
13–14	345 071	296 032	–	–	–	–	345 071	296 032
15	521 440	94 200	–	–	–	–	521 440	94 200
16	364 800	41 200	–	–	–	–	364 800	41 200
17	–	–	–	–	191 305	377 939	191 305	377 939
Total	1 492 626*	470 626†	93 694	86 125	277 505	437 939	1 863 825*	944 690†
				Exported (tons dry mass)				
Total	1 397	656	99	100	198	413	1 694	1 169

* Excludes 267 780 kg wet mass (dry mass *c.* 40 167 kg if 15% moisture assumed) of harvested kelp in Area 9
† Excludes 268 005 kg wet mass (dry mass *c.* 40 201 kg if 15% moisture assumed) of harvested kelp in Area 9

Cape, and these red seaweeds producing high-quality agar find a ready market in Japan. In 1993, 86 t was plucked in comparison with 94 t in 1992 (Table IV).

Commercial collections of beach-cast kelp (mostly *Ecklonia maxima* with some *Laminaria pallida* and *L. schinzii* from the Northern Cape) have declined in recent years (Table IV) as a result of the continued depression in the world kelp market. Until a local alginate plant is constructed for processing of kelp in South Africa, marketing prospects for these brown seaweeds are likely to remain bleak. However, the harvesting of fresh kelp near Kommetjie for the production of an agricultural plant-growth stimulant has continued, with some 270 t of *Ecklonia* used in 1992 and 1993.

There has been strong interest in using freshly harvested kelp as a feed for cultured abalone, and an experimental study of kelp regrowth and the effects on other kelp-bed organisms has now been under way for more than two years at Danger Point.

3.2 Bait organisms

TWO new permits were issued for the collection of white mussel *Donax serra* on the West Coast for bait purposes, bringing the total to six. The two new permits were for the Koeberg/Bok Point and Paternoster/Britannia Bay areas. In consequence, total collections increased to 26 249 mussels for 1993, compared with 20 145 for 1992.

No collections of the sand clam *Mactra glabrata* were recorded for 1993, compared with 36 kg in 1992.

The permit issued to an abalone canning factory in Hermanus to allow marketing of red bait *Pyura stolonifera* adhering to abalone shells was renewed in 1993. However, nothing was reported for 1993 in comparison with 36 kg in 1992.

Rafts used for culturing the Mediterranean mussel *Mytilus galloprovincialis* in Saldanha Bay

3.3 Horse mussels

AN experimental permit was issued for the collection by diving of *Atrina squamifera* for the local restaurant trade. A total of 1 850 was collected weighing 713 kg, mainly from the Hout Bay area at depths between 15 and 30 m. No collecting is allowed in False Bay or Walker bay.

3.4 Mariculture

THE farming of marine species, or mariculture, has developed rapidly in South Africa in recent years and, although lagging in production behind traditional mariculture nations, such as Japan, is considered to be a growing industry with significant potential.

In total, 36 mariculture permits were valid during 1993 for areas between Amatikulu in Natal and Alexander Bay, as well as for Walvis Bay. Of these, 15 were for the farming of oysters, 10 for abalone, seven for black mussels, two for red bait, one for prawns and one for clams. Other applications to farm oysters, mussels and salmon are still under consideration.

From the Saldanha Bay area red bait is harvested for bait as a by-product of the mussel farming industry. A total of 9 800 kg was marketed in 1993 compared with 573 kg in 1992.

The farming of the widespread but exotic Mediterranean (or blue) mussel *Mytilus galloprovincialis* now takes place in Saldanha Bay only, where three of the four farms produced 1 891 t during 1993. This figure is down on the 2 163 t for 1992 and 1 961 t for 1991, but is expected to increase again during 1994. the production of mussels in Algoa Bay ceased in 1992 as the producer is now concentrating solely

Two pods of red bait *Pyura stoloniforma*, the flesh of which is popular with anglers as bait

on oyster cultivation. Some 9% of the mussels are sold fresh, 90% frozen (a small portion being processed) and 1% smoked and canned.

The production of the cultivated oyster *Crassostrea gigas*, currently reared from imported spat, mainly takes place at Knysna, Port Elizabeth and Walvis Bay. Farms have also recently been established at Alexander Bay, Port Nolloth, St Francis Bay and Port Alfred, the number of participants increasing from 9 in 1992 to 12 in 1993, but one producer at Port Elizabeth went out of business and there are permit-holders that have not yet marketed oysters. National production reached a record level of 5 million oysters in 1993, compared with 4 million during the previous three years. The recent entrant at Walvis Bay maintained his output for 1993 at 508 000 compared with 550 000 in 1992 (Table V). These oysters are sold fresh on the local market. Local spat production has been initiated in St Helena Bay and should reduce the need to import foreign stock in future.

Table V: Commercial oyster production and marketers

Locality/Product	Number of size oysters		Number of marketers* 1993
	1992	1993	
Natural picked	495 148	366 597	11
Marketable "wash–ups"	16 018	20 631	1
Subtotal	511 166	387 228	12
Cultivated			
Walvis Bay	549 685	508 270	1
Saldanha Bay	300 331	364 995	3
Knysna	1 631 190	2 700 800	2
Port Elizabeth†	1 671 193	1 131 303	2
Other‡	–	316 284	4
Subtotal	4 152 399	5 021 652	12
Total	4 663 565	5 408 880	24

* Marketers involved in more than one concession area or activity were counted separately for each

† Includes fattened wash-ups. There were also 21 901 undersize wash-ups in 1992 and 12 800 in 1993

‡ Alexander Bay, Port Nolloth, St Francis Bay and Port Alfred

The farming of the local abalone species *Haliotis midae* is still in the advanced developmental stage, local industry having made significant investments into the research and development of abalone production. Some six hatcheries have been established in the

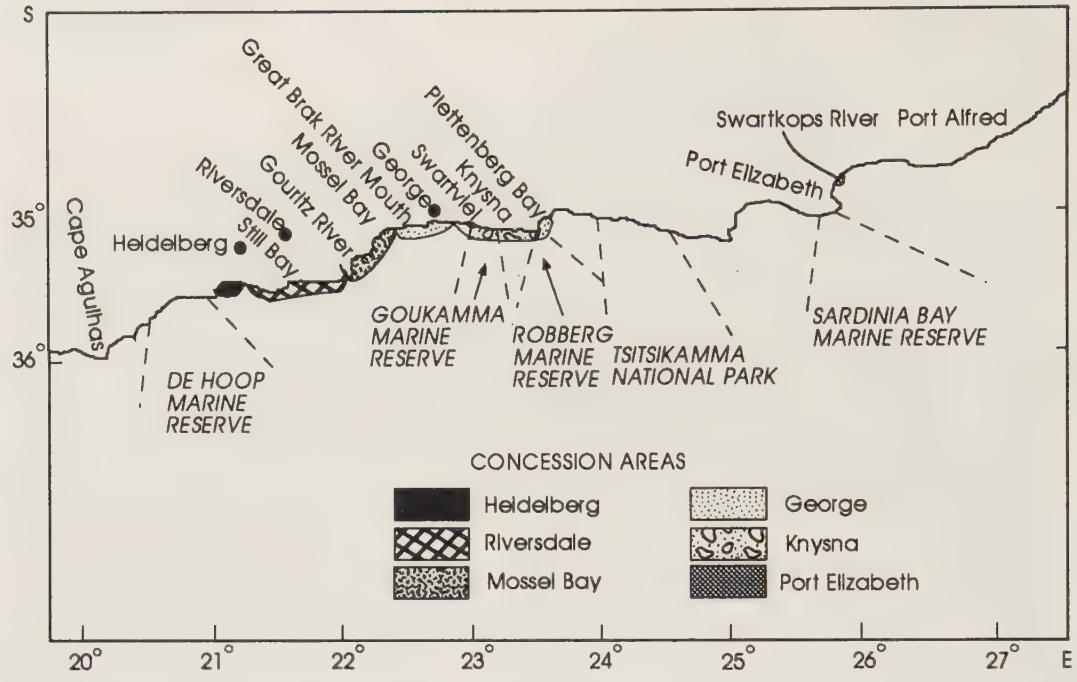


Fig. 1: Concession areas for the picking of wild oysters *Striostrea margaritacea* along the Cape south coast

Cape region and the first "cocktail" abalone are now becoming available for export.

The farming of the prawns, *Penaeus monodon, P. japonicus* and *P. indicus*, takes place at Amatikulu in Natal where some 35 t were produced for the local market in 1993. Brood stock is collected from the wild for this purpose.

3.5 Wild oysters

THE number of "wild" oysters *Striostrea margaritacea* collected from the intertidal area along the South Coast by "pickers" dropped again. In total, 387 228 oysters were collected in 1993, compared with 495 148 in 1992 (see Table V). Pickers with permits for the corresponding years numbered 125 and 154 out of a possible 174 for all areas. The areas in which pickers are allowed to operate are shown in Figure 1.

The regulations appertaining to oysters were amended by Government Notice R. 2556 in *Government Gazette* 15389 of 31 December. The closed season from 1 December to 15 January no longer applies to members of the public, who may collect up to 25 oysters per day for their own use, but the use of artificial breathing apparatus is now limited to a snorkel. Commercial marketers and processors now also have to purchase a permit to receive oysters from permitted pickers and these commercial pickers may only deliver to approved marketers. The oysters so delivered must be in a whole state.

3.6 Abalone

CATCH rates of commercial divers, as well as the average sizes of abalone landed in the seven fishing zones, provide the baseline

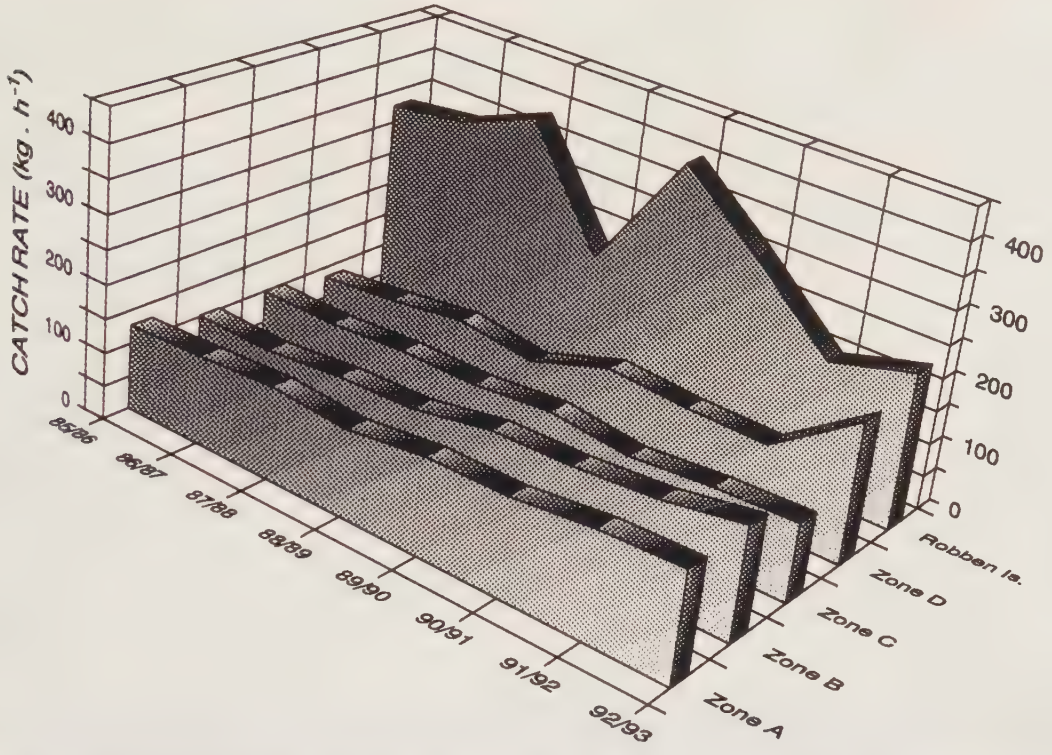


Fig. 2: Trends in the *cpue* of abalone in the four main commercial diving zones and at Robben Island, 1985/86–1992/93

information on which this fishery is managed. Catch and catch per unit effort (*cpue*) for each zone are shown in Table VI for the past two seasons, and in Figure 2 trends in *cpue* from 1988/89 to 1992/93 for the most important zones, A to D, are presented.

Figure 2 shows that the catch rates in Zones A and B appear to be improving, providing

Table VI: Catch and catch rate for the abalone fishing zones

Zone – Area	Catch (t)		Catch rate (kg·diver–h^{-1})	
	1991/92	1992/93	1991/92	1992/93
A Quoin Point – Pearly Beach	194	194	159	163
B Franskraal – De Kelders	145	150	146	168
C Hermanus – Hawston	139	150	113	117
D Kleinmond – Holbaai Point	56	55	125	212
E Cape Point – Mouille Point	–	–	–	–
F Robben Island	30	31	141	237
– Dyer Island	22	24	203	174
G Table Bay – Cape Columbine	–	–	–	–
All zones	587	603	141	156

divers with progressively better returns per hour underwater. In Zone C the *cpue* remains depressed, despite a reduction of 20 t in *TAC* two years previously. The catch rate for Zone D jumped to an unnatural high when the divers concentrated on an area near Cape Hangklip that was reopened after previous closure. The catch rates from Robben Island (Zone F, not shown), where there is still a high proportion of old accumulated stocks, continue to fluctuate at a high level. Dyer Island, which was closed to fishing in 1983, was reopened at a conservative *TAC* of 25 t in 1991. This area is being maintained at above-average stock density as a safety measure, and the *TAC* is removed by all the divers over a short pre-arranged period, before the area is again closed for the rest of the season. Zone E, like Zone G, has been closed because of declining stocks, also apparently resulting from recruitment problems, and both these grounds will be reserved for recreational use.

In general, therefore, the fishery based in the traditional grounds between Quoin Point and Cape Hangklip appears to be continuing the trend of overall stability or improvement which has been in evidence since the early 1980s.

The *TAC*s per zone for the 1992/93 and 1993/94 seasons are illustrated in Figure 3. These show that, as a result of the failure of the West Coast to produce sustainable yields, there is now a major dependence of the fishery on the traditional zones, A to D, east of Hangklip.

The whole-mass receiving allocation for the 1993/94 season (October 1993 to June 1994) was again based on recommendations initially submitted by the Sea Fisheries Research Institute to the Sea Fishery Advisory Committee. The sum of the *TAC*s for Zones A to D and F was set at 615 t, an increase of 10 t. This overall increase arose from an increase of 35 t in Zone D (as a result of the reopening of one area), a decrease of 10 t in Zone C (an attempt to boost catch rates in this zone) and a decrease of 15 t in Zone F (because of concern over poor recruitment rates).

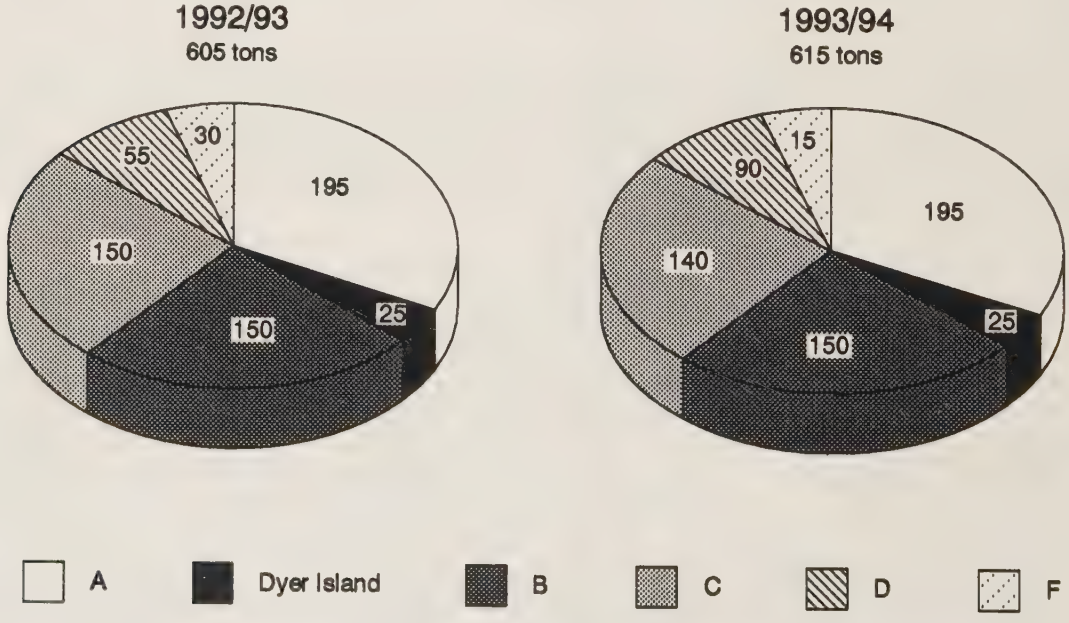


Fig. 3: *TAC*s for abalone per commercial diving zone in the 1992/93 and 1993/94 seasons

Table VII: Commercial production of abalone

Commodity (kg)	1991/92	1992/93
Canned pieces*	121 887†	117 753
Other canned products*	6 647	10 569
Frozen pieces*	19 223	24 023
Frozen whole (in shell)	4 817	4 220
Fresh/Live (in shell)	1 618	12 239
Total	154 192	168 804

* To convert to whole mass, multiply canned pieces and products by 4 and frozen pieces by 3
† Corrected

The whole-mass allocation was introduced in 1983 at 660 t, but for the past five years it has fluctuated at around 600 t. Since significant increases in *TAC* are unlikely, the industry has recently been marketing more value-added product. Production figures for the past two seasons reflecting the varied production categories are shown in Table VII.

A new control measure was introduced in 1993 directed at reducing possible loss of quota abalone: once abalone are landed at the slipway, the loading compartment of the diver's vehicle is sealed by the Conservation Officer on duty and the load documented. This seal is then only broken at the factory, and the documentation cross-checked.

Telephone surveys of recreational abalone fishermen have shown that this sector is expanding rapidly and landed an estimated 367 t in 1991/92 and 495 t in 1992/93. The results show that future management of the fishery will have to take this sector into account and that ways should be found of preventing uncontrolled expansion to the detriment of the resource and of reconciling the interests of the commercial and recreational sectors.

Recreational diving for abalone *Haliotis midae*

3.7 Limpets

THIS new fishery started in 1992 with a *TAC* set at 26 t for *Patella granatina* and 13 t for *P. argenvillei*, based on comprehensive research recommendations from the University of Cape Town. Size limits were determined, and a by-catch of sublegal sizes of less than 5% of total landed biomass was permitted. Such a by-catch cannot be avoided because juvenile limpets normally adhere to the shells of adults. Landings for 1993 were nil due to marketing problems compared with 1992 when, in response to a decline in market demand, only 348 kg of *P. granatina* and 88 kg of *P. argenvillei* were landed.

3.8 Cephalopods

THE exact number of cephalopod species occurring in the by-catch of the demersal and shrimp fisheries is not known. It is large, because the cephalopod fauna of the South African shelf is rich, especially off Natal. However, the quantities caught are small, and most of these species have no real commercial significance. Only one species, *Loligo vulgaris reynaudii* (chokka squid), is the object of a localized fishery between Plettenberg Bay and Port Alfred. The method used is hand-jigging from boats mostly of small and medium size. The fishery is regulated, *inter alia*, by issuing permits.

The setting of a *TAC* cannot be recommended for squid because of their short (annual) life cycle and highly unpredictable abundance and availability in any given year. Instead, various forms of effort control are used in many squid fisheries around the world. This approach is also applied to the local chokka fishery. It includes an upper limit to the number of boats in the squid fishing fleet with strict criteria for vessel replacement, an annual closed season at peak spawning time and a closed fishing zone (the Tsitsikamma National Park). Voluntary size limits are also adopted by the industry from time to time, though admittedly this action is market-driven.

The fleet of mostly small craft, skiboats, catamarans and decked boats, active in the squid fishery by the jigging method, mainly on the Cape east and south-east coast, consists of vessels that are allowed to catch (C-permits), process (F-permits) and transport (X-permits) squid. Limitation of fishing effort was introduced in 1987, when 295 permits were granted to vessels jigging squid.

Jigging a chokka squid *Loligo vulgaris reynaudii*

A squid-jigging catamaran on the Cape south coast

The number of crew rather than the number of vessels has become the main criterion, so crew may be split between two vessels or consolidated on one instead of two, as that permits are freely transferable. These vessels numbered 302 in the squid permit years 1990/91 and 1991/92 and 291 in 1992/93 (Table VIII). The catchers (including CF) decreased from 273 in 1990/91 to 258 in 1992/93, but there has been a recent increase in the number of those that could process. This affected only vessels that could both catch and process (CF) and they increased from 34 in 1990/91 to 43 in 1992/93, vessels with only factory permits active in the chokka squid fishery remaining constant at 10 during the three years. The trend for owners to convert their craft to freezer vessels is increasing. Combining two catcher permits and transferring them to a freezer automatically entitles a vessel to a maximum of four extra crew for packers. This also results in a product of higher quality, hence the increase in factory vessels. The number of carrier vessels (X-permits) varied between 19 and 24 in the years under discussion (Table VIII).

Table VIII has been improved by giving the permits as at the end of the squid permit year (25 or 31 October) and including details of the linefishing permits held by them. Squid-jiggers (holders of C-permits) are nowadays obliged also to have a linefishing permit. However, linefishing permits are renewed from 1 July and permit-holders have six months in which to do so. The outcome of this is that inevitably some linefishing permits will not have been renewed by 25 or 31 October. This

Table VIII: Permits for jigging (C), processing (F) and transporting (X) squid issued to licensed South African commercial fishing vessels as on the last day of the squid permit year 1992/93 (25 October), 1991/92 and 1990/91 (31 October)*, including details of line-fishing permits held on those dates (A: commercial; B: semi-commercial; T: tuna linefishing)

Permit type/ Registration area**	SH	SBH	CTA	HTB	KB†	C	DDF	BR	MBA	G	KN†	H	PEA	P†	N	Total boats	Total squid permits
1992/93							One squid permit										
C‡	–	–	–	–	–	–	–	–	–	–	–	1	2	–	–	3	
F	–		6	–	–	–	–	–	–	–	–	–	2	–	–	8	
X	–	–	–	–	–	–	–	–	–	1	–	18	1	–	–	20	
Subtotal	–	–	6	–	–	–	–	–	–	1	–	19	5	–	–	31	31
CA	–	–	1	4	15	1	–	–	2	–	–	10	2	9	1	45	
CB	–	–	–	1	9	–	–	–	2	–	4	19	4	10	–	49	
CT	–		–	–	1	–	–	–	–	–	–	–	–	–	–	1	
Subtotal	–	–	1	5	25	1	–	–	4	–	4	29	6	19	1	95	95
CAT	–	–	–	1	11	–	–	1	–	1	5	24	18	2	2	65	
CBT	1	–	1	5	3	–	–	–	–	–	3	30	6	3	–	52	
FBT	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	2	
XAT		–	–	–	–	–	–	–	–	–	–	1	–	–	–	1	
XBT	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	2	
Subtotal	1	–	3	6	14	–	–	1	–	1	8	55	26	5	2	122	122
Total one squid permit	1	–	10	11	39	1	–	1	4	2	12	103	37	24	3	248	248
							Two squid permits										
CF‡	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	
Subtotal	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	2
CFA	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	1	
CFB	–	1	2	–	–	–	–	–	–	–	–	–	–	–	–	3	
Subtotal		1	2	–	–	–	–	–	–	–	–	–	1	–	–	4	8
CFAT	1	–	–	9	1	–	2	–	–	–	–	1	8	–	–	22	
CFBT	–	1	1	5	–	–	–	–	2	–	–	–	7	–	–	16	
Subtotal	1	1	1	14	1	–	2	–	2	–	–	1	15	–	–	38	76
Total two squid permits	1	2	3	14	1	–	2	–	2	–	–	1	17	–	–	43	86

Table VIII *(continued)*

Permit type/ Registration area**	SH	SBH	CTA	HTB	KB†	C	DDF	BR	MBA	G	KN†	H	PEA	P†	N	Total boats	Total squid permits
1992/93																	
C‡	–	–	–	–	–	–	–	–	–	–	–	1	2	–	–	3	
Squid only	–	–	6	–	–	–	–	–	–	1	–	19	6	–	–	32	
Squid + A	–	–	1	4	15	1	–	–	2	–	–	10	3	9	1	46	
Squid + B	–	1	2	1	9	–	–	–	2	–	4	19	4	10	–	52	
Squid + T	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1	
Squid + AT	1	–	–	10	12	–	2	1	–	1	5	26	26	2	2	88	
Squid + BT	1	1	4	10	3	–	–	–	2	–	3	30	15	3	–	72	
All C	1	–	2	11	39	11	–	1	4	1	12	84	32	24	3	215	
All CF	1	2	3	14	1	–	2	–	2	–	–	1	17	–	–	43	
All F	–	–	8	–	–	–	–	–	–	–	–	–	2	–	–	10	
All X	–	–	–	–	–	–	–	–	–	1	–	19	3	–	–	23	
Total squid boats	2	2	13	25	40	1	2	1	6	2	12	104	52	24	3	291	
Total squid permits	3	4	16	39	41	1	4	1	8	2	12	105	71	24	3		334
1991/92																	
Squid only	–	–	6	–	–	–	–	–	–	1	–	20	5	1	–	33	
Squid + A	–	–	–	–	17	–	–	–	–	–	–	6	4	10	–	37	
Squid + B	–	1	–	1	10	–	–	–	2	–	5	19	2	8	–	48	
Squid + T	–	–	–	–	1	–	–	–	–	–	–	–	1	–	–	2	
Squid + AT	1	–	2	15	12	1	2	1	–	1	3	34	26	2	4	104	
Squid + BT	1	1	5	10	7	–	–	–	2	–	2	33	14	3	–	78	
All C	–	–	2	11	46	1	1	1	3	1	10	93	35	24	4	232	
All CF	2	2	3	15	1	–	1	–	1	–	–	–	11	–	–	36	
All F	–	–	8	–	–	–	–	–	–	–	–	–	2	–	–	10	
All X	–	–	–	–	–	–	–	–	–	1	–	19	4	–	–	24	
Total squid boats	2	2	13	26	47	1	2	1	4	2	10	112	52	24	4	302	
Total squid permits	4	4	16	41	48	1	3	1	5	2	10	112	63	24	4		338
1990/91																	
Squid only	1	–	6	–	5	–	–	–	–	–	1	12	11	2	–	38	
Squid + A	–	–	–	–	12	–	–	–	–	–	–	4	3	12	–	31	
Squid + B	–	–	–	–	8	–	–	–	1	–	1	12	3	8	–	33	
Squid + T	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1	

Table VIII *(continued)*

Permit type/ Registration area**	SH	SBH	CTA	HTB	KB†	C	DDF	BR	MBA	G	KN†	H	PEA	P†	N	Total boats	Total squid permits
Squid + AT	–	–	2	17	16	1	2	1	–	2	5	35	26	4	4	115	
Squid + BT	–	–	5	9	7	–	–	–	1	–	3	41	17	1	–	84	
All C	–	–	3	10	48	1	–	1	2	2	9	91	41	27	4	239	
All CF	1	–	2	16	1	–	2	–	–	–	–	–	12	–	–	34	
All F	–	–	8	–	–	–	–	–	–	–	–	–	2	–	–	10	
All X	–	–	–	–	–	–	–	–	–	–	1	13	5	–	–	19	
Total squid boats	1	–	13	26	49	1	2	1	2	2	10	104	60	27	4	302	
Total squid permits	2	–	15	42	50	1	4	1	2	2	10	104	72	27	4		336

* Figures for 1990/91 and 1991/92 updated by change from total over full squid permit year to last day of permit year

** The codes for registration areas are explained in Table III

† Includes so-called restricted C-permits for bait purposes only. The original 46 permits at Kalk Bay, 3 at Knysna and 24 at Port Alfred are steadily decreasing as new permits are not issued and old ones not renewed

‡ Represent boats that have not yet renewed their linefishing permits (compulsory for squid boats) for 1993/94 by the end of the squid season 1992/93. The permit year for linefishing runs from 1 July to 30 June

is illustrated by the three vessels that had a C-permit only and the one that had CF only on 25 October 1993 (Table (VIII).

Few of the factory and carrier vessels in the squid fishery have linefishing permits, so that 32 (11%) of the fleet had no such permits in 1992/93 (Table VIII). Of the remainder (almost all catchers) 46% held commercial linefishing (A) and 43% semi-commercial (B) permits, most of them also having a tuna (T) permit. The A-permits decreased from 48% in 1990/91 and the B-permits showed a corresponding increase from 39%.

This fishery is relatively stable; catches have been recorded from 1985, ranging between 2,6 and 9,8 thousand tons (mean catch: 4,7 thousand tons). In 1993, 6 308 t was caught by jigging (Table IX), most of it in December in the area between Algoa Bay and Port Alfred. Catches in December were at a record level. Usually, most of the catches are taken from September to November in St Francis Bay and adjacent areas. In that respect, 1992 and 1993 were rather unusual.

Most of the catch is exported to Europe. The estimated wholesale value of these exports in 1993 was R66,2 million, which makes squid one of South Africa's most valuable fisheries.

There is a small by-catch of chokka in South African demersal trawls (Table IX), but it is systematically declining. In 1992 and 1993

Table IX: Squid catches (t) by various sectors of the fishery

Sector	1992	1993
Foreign trawl	31	–
South African trawl		
Red squid	300	59
White squid	256	278
Subtotal S.A. trawl	556	337
Crustacean trawl	7	6
Jigging	2 588	6 308
Total all sectors	3 182	6 651

The common octopus *Octopus vulgaris* used as bait or as food and collected from rocks or as by-catch in rock-lobster traps or inshore bottom trawls

catches were the lowest since 1987, down from 606 t in 1990 and 463 t in 1991. In the late 1970s this catch exceeded 2 000 t. In 1993 there was no foreign by-catch of squid, because foreign vessels had been excluded from South African waters. In 1983 the foreign catch had been about 2 300 t, but declined to 33 t in 1991.

The red squids (*Todaropsis eblanae* and *Todarodes angolensis*) are taken mainly on the West Coast. Actual catches (300 t reported in 1992 and 59 t in 1993) were probably higher than those reported as there is no stable and profitable market for red squid and some portion of the catch may have been discarded at sea. The 1992 catch was rather exceptional and the highest ever recorded (a peak of 260 t was recorded in 1988). Catches in 1990 were 53 t and in 1991, 78 t.

Several octopod species are taken in South African waters. On the West and South-West coasts *Octopus vulgaris* is caught in shallow water (especially by the rock-lobster fisheries) and *O. magnificus* in the deeper water (by the deep-sea trawling fleet). The downturn in the West Coast rock-lobster fishery in recent years reduced the by-catch of *O. vulgaris* to insignificance.

The demersal trawling fishery reported 122 t of octopods in 1992 and 148 t in 1993 (a peak of 115 t was recorded in 1988). Octopods caught farther east are not clearly identified; it is believed that the most common species are *Octopus cyanea* and *Velodona togata*.

The Natal crustacean trawl fishery contributes towards the by-catch of cephalopods (Table X). Catches of octopods in 1992 and especially in 1993 declined, when compared with 1990 and 1991 (16,1 and 19,9 t, respec-

Table X: Cephalopod catches (in kg) off Natal by the East Coast crustacean fishery

Species	1992	1993
Squid	7 334	5 517
Octopus	14 875	4 102
Cuttlefish	9 757	8 977
Total	31 966	18 596

Table XI: Landings (kg) of crabs and whelks caught in ring nets

Year	Crab	Whelk
1989	683	3 740
1990	130	240
1991	49	2 183
1992	177	2 158
1993	–	2 417

tively). Catches of squid were steady and those of cuttlefish increased markedly in 1992 and 1993 (Table X) when compared with 1990 and 1991 (1,8 and 4,8 t, respectively). One species (*Loligo duvauceli*) dominates the squid catch; two common species (*Octopus cyanea* and *Velodona togata*) most probably constitute the bulk of the octopod catch. The cuttlefish species caught are unknown.

3.9 Whelks and crabs

THIS experimental fishery is directed at a whelk (*Bullia laevissima*), with a crab (*Ovalipes trimaculata*) by-catch. There is one participant, who operates along the West Coast from a ski boat using modified ring nets in sandy areas less than 10 m deep. Annual landings since the inception of the fishery are shown in Table XI.

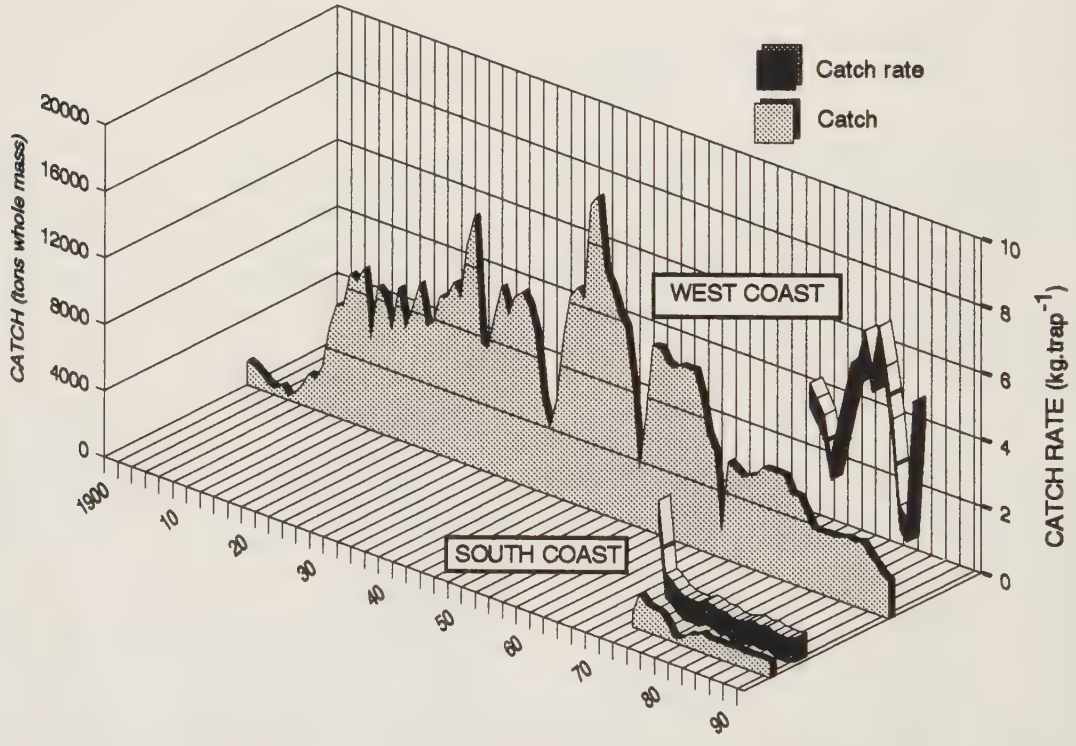


Fig. 4: Time series of catches and catch rates in the fisheries for West and South Coast rock lobster

Table XII: Actual catches of West Coast rock lobster in 1991/92 and 1992/93 and Total Allowable Catches (*TAC*s) for the 1992/93 and 1993/94 seasons per fishing zone

Area	Number	Zone	Actual catch (t)		*TAC* (t whole)	
			1991/92 (minimum size 89 & 75 mm)*	1992/93 (minimum size 80 mm)	1992/93	1993/94 (minimum size 75 mm)
Port Nolloth	1	A	31	46	40	40
Hondeklip Bay	2					
Lambert's Bay	3	B	233	212	210	480
Elands Bay	4		280	329	260	
St Helena Bay	5	C	605	488	456	400
Saldanha Bay	6					
Dassen Island	7	D	509	379	384	340
Cape Peninsula	8		766†	654	760	880‡
Robben Island	9		9	-	20	-‡
Hout Bay/Oudeschip	10		20	39	40	30
False Bay	11	E	30	30	30	30
Total			2 483	2 177	2 200	2 200

* The minimum size (carapace length) was reduced on 12 April 1992
† Includes catches made in deeper water south of Cape Point under special concession (originally 200 t, but reduced to 190 t when minimum size and *TAC* were lowered)
‡ The allocation for Robben Island is included with that for the Cape Peninsula

3.10 Crustaceans

3.10.1 WEST COAST ROCK LOBSTER

AS a result of continued low rock-lobster growth and the West Coast lobster fishery's poor performance during the first part of the 1991/92 season, a reduction in the minimum size from 89 mm to 75 mm carapace length (*cpl*) was introduced as a temporary relief measure in April 1992. The *TAC* for the 1991/92 season was 2 480 t, with 1 555 t caught at the old size limit of 89 mm *cpl* and 925 t at the 75 mm limit. After intensive scientific debate the minimum size for the 1992/93 season was set at 80 mm *cpl* with a corresponding *TAC* of 2 200 t (Table XII).

The tolerance for transferability of *TAC*s was set at 15% for the 1992/93 season (double that of the previous season) in all areas excepting Zone A, False Bay, Hout Bay and Robben Island, where no tolerance was allowed. Actual catches and *TAC*s per area are shown in Table XII.

Meaningful comparison of catch rates made in the 1992/93 season with those of previous seasons is not possible because of the change in minimum size, but a time series of catches and catch rates is presented in Figure 4 to show long-term trends. It must be borne in mind that since 1970/71 catches have varied directly in accordance with the quota/*TAC* levels set.

Table XIII: Sales of West Coast rock-lobster products

Commodity (kg as specified)	Export		Local		Total	
	1991/92	1992/93	1991/92	1992/93	1991/92	1992/93
Frozen tails*	112 518	54 135	23 980	17 968	136 498	72 103
Whole cooked, frozen	898 350	1 019 830	122 461	146 597	1 020 811	1 166 427
Whole raw, frozen	310 762	193 450	70 000	24 105	380 762	217 555
Live	207 870	388 725	133 776	94 405	341 646	483 130
Total	1 529 500	1 656 140	326 237	283 075	1 879 717	1 939 215

* To convert to whole mass divide by 0,3011

The *TAC* allocation of 40 t for the Hout Bay culling experiment was caught over the period December 1992–February 1993. Catch rates (3,44 kg · trap-haul^{-1}) were lower than those recorded in the 1991/92 season, but higher than those in 1990/91.

Export and local market sales for the 1991/92 and 1992/93 seasons are presented in Table XIII. As in previous seasons, the whole cooked product dominated the trade in 1992/93. An increase of 41% (in comparison with the previous season) in the sales of live lobster was noted in 1992/93 while a 47% decrease in the sales of frozen tails was evident over the same period.

3.10.2 SOUTH COAST ROCK LOBSTER

THE production allocation of 450 t tail mass remained unchanged and was once again caught in full in the 1992/93 season. Marked changes in the contributions of the Agulhas Bank and Cape St Francis areas to both catch and effort were noted in 1992/93, compared to the previous season. Fishing effort on the Agulhas Bank increased from 20 to 32% of total fishing effort while the catch contribution rose from 27 to 42% of total catch over the same period. In the Cape St Francis area (which in the past contributed the bulk of the catch and effort), catch and effort contributions decreased from 43 to 34% and from 50 to 38% respectively. In Figure 4 catches and catch rates are compared with those of West Coast rock lobster. The fishery for South Coast rock lobster commenced in 1974 and catches have been limited by a closed season and, since 1984/85, by a quota/*TAC*, but there is no minimum size limit.

The production of South Coast rock-lobster commodities in 1992/93 (Table XIV) indicated a reversal of the trend shown in previous seasons, the production of frozen tails increasing by 46% compared with 1991/92 and the live product decreasing by 26% over the same period. A reduction of 54% in the production of whole uncooked frozen product was noted in 1992/93 while frozen whole cooked lobster, introduced as a South Coast lobster commodity for the first time in 1991/92, showed a slight increase. Converted to tail mass, production in 1991/92 amounted to 430 t and in 1992/93 to 477 t. This means that the production allocation of 450 t was exceeded in 1992/93.

Table XIV: Production of South Coast rock-lobster commodities

Commodity (kg as specified)	1991/92	1992/93
Frozen tails	259 855	379 868
Whole raw, frozen*	223 630	100 816
Whole cooked, frozen*	2 212	4 650
Live*	139 093	102 380
Total	624 790	587 714

* To convert whole mass to tail mass, multiply by 0,465

3.10.3 EAST COAST CRUSTACEANS

FOR the past three years eight trawlers have been permitted to fish for crustaceans off Natal, five being allowed inside the limit of 7 nautical miles and three having to keep outside it. None of these had linefishing permits in 1993 and in size they ranged between 22 and 39 m. In fact, only six vessels were active in this fishery in 1993, fishing with bottom trawls with small-mesh cod-ends both inside the limit (targeting white prawn) and outside it (targeting pink prawn, langoustine, rock lobster, red crab and others).

As in the past, landings for the various species fluctuated substantially between years. The decreased landings of inshore prawn species in 1993 (Table XV) are thought to be due to reduced recruitment of sub-adults to the Tugela Bank during the 1992/93 summer — a result of the continuing drought. Landings of pink prawn in 1993 were average, while the recent trend of increased landings of East Coast rock lobster and langoustine continued as a result of directed fishing on these two valuable species.

Table XV: Landings (kg whole mass) in Natal of the East Coast crustacean trawl fishery

Species	1992	1993
Inshore prawns (Tugela)	86 825	51 584
Offshore prawns (pink)	111 726	166 165
Langoustine	70 427	83 388
Shrimps	6 369	12 552
East Coast deep-water rock lobster	30 723	33 431
Shovelnose rock lobster	255	149
Inshore crab (Tugela)	6 710	1 587
Offshore crab (Red)	186 848	137 552
Squids	7 334	5 517
Octopus	14 875	6 920
Cuttlefish	9 757	11 021
Fish	58 007	44 511
Total	589 856	554 377

3.11 Pelagic fish

3.11.1 CATCH

THE total catch by the pelagic fleet in 1993 amounted to 357 040 t (Table XVI), a considerable decrease in comparison with 1992 when total catches reached 452 705 t. The decline is linked to a drop in anchovy catches

The two most common pelagic shoaling fishes caught in purse seines. The smaller anchovy *Engraulis capensis* is mostly processed into fish meal and oil, but the larger pilchard *Sardinops sagax* is preferred for canning

Table XVI: Landings of pelagic fish at South-Western Cape factories and by bait boats in 1992 and 1993 (reported species composition adjusted by counts of fish samples by C.P.A. Fishery Control Officers)

Month	Anchovy		Pilchard		Horse mackerel		Chub mackerel		Round herring		Lanternfish		Other*		Total	
	ton	%	ton	%	ton	%	ton	%	ton	%	ton	%	ton	%	ton	%
January	18 835	8,0	4 748	9,4	5 118	43,9	40	10,8	292	0,5	33	2,8	79	8,2	29 145	8,2
February	20 692	8,8	8 264	16,3	4 009	34,4	21	5,7	11 144	19,8	2	0,2	140	14,4	44 272	12,4
March	17 703	7,5	7 372	14,5	336	2,9	252	67,9	16 909	30,0	41	3,5	399	41,2	43 012	12,0
April	43 220	18,3	5 951	11,7	765	6,6	9	2,4	7 208	12,8	8	0,7	128	13,2	57 289	16,0
May	14 085	6,0	7 970	15,7	301	2,6	46	12,1	8 395	14,9	937	79,7	10	1,0	31 744	8,9
June	1 196	0,5	5 711	11,3	78	0,7	+	0,0	9 560	17,0	155	13,2	10	1,0	16 710	4,7
July	10 878	4,6	1 511	3,0	13	0,1	–	–	742	1,3	–	–	4	0,4	13 148	3,7
August	67 182	28,5	2 694	5,3	175	1,5	3	0,8	237	0,4	+	0,0	10	1,0	70 301	19,7
September	38 908	16,5	1 628	3,2	847	7,3	+	0,1	1 780	3,2	–	–	184	19,0	43 347	12,1
October	3 051	1,3	1 449	2,9	4	–	–	–	18	0,0	–	–	–	–	4 522	1,3
November	15	–	1 440	2,8	–	–	+	0,1	39	0,1	+	0,0	–	–	1 494	0,4
December	65	–	1 979	3,9	–	–	+	0,1	7	0,0	–	–	5	0,5	2 056	0,6
Total (1993)	235 830	100,0	50 717	100,0	11 646	100,0	371	100,0	56 331	100,0	1 176	100,1	969	99,9	357 040	100,0
Percentage		66,1		14,2		3,3		0,1		15,8		0,3		0,3		100,1
Total (1992)	347 752		53 416		1 968		370		47 440		656		1 103		452 705	
Percentage		76,8		11,8		0,4		0,1		10,5		0,1		0,2		99,9

* Juvenile gurnard, mantis shrimps, snoek, buttersnoek, hake, jellies and ice but also small quantities of other species

of about 110 000 t in relation to the previous year. The initial *TAC* for 1993 had been set at 260 000 t, following an estimate of anchovy spawner biomass of just under 1,5 million tons from the survey in November 1992. After the recruitment survey in May 1993 had shown the second best recruitment in numbers since 1985, the *TAC* was raised to 360 000 t. In spite of these good prospects the year was difficult for the sector of the industry that provides fish meal. Serious pilchard by-catch problems forced the industry to close areas to fishing repeatedly during the year. In spite of the apparent abundance of the new year-class, the size of the fish was small and as a result the fishery was virtually closed during June to give the incoming fish an opportunity of increasing in size. Later, and probably as a result of high mortality, the recruits were not available in sufficient quantities and the *TAC* could not be caught in spite of the fact that operations continued beyond the traditional fishing season.

Pilchard catches showed a slight decrease, 50 717 t being caught in 1993, a figure somewhat lower than the 53 416 t caught in 1992 (Table XVI). The recommended *TAC* for the year had initially been 42 000 t, but the by-catch allowance was increased by 7 600 t in May to enable the industry to continue fishing for anchovy. The high percentage of juvenile pilchard found in anchovy catches was mainly related to a very successful pilchard recruitment in 1993. The pilchard *TAC* in 1993 included 24 206 t for directed catches intended for canning, 5 214 t to be used as frozen bait and cutlets for human consumption or for indus-

Table XVII: Pelagic fishing industry: production of South-Western Cape factories in 1992 and 1993

Month	Meal		Body oil		Canned*									
					Anchovy		Pilchard		Horse mackerel		Round herring		Total	
	ton	%	ton	%	kg	%	kg	%	kg	%	kg	%	kg	%
January	6 291	7,8	1 108	15,3	51 796	4,8	1 554 448	11,9	–	–	–	–	1 606 244	10,0
February	9 665	12,0	1 092	15,1	210 385	19,6	3 656 314	27,9	–	–	171 529	9,3	4 038 228	25,0
March	9 721	12,1	857	11,9	218 668	20,4	1 415 813	10,8	80 284	68,3	473 417	25,8	2 188 182	13,6
April	13 725	17,0	2 465	34,1	182 499	17,0	1 102 636	8,4	37 342	31,7	399 193	21,7	1 721 670	10,7
May	6 385	7,9	646	8,9	170 564	15,9	2 305 005	17,6	–		308 695	16,8	2 784 264	17,3
June	4 015	5,0	263	3,6	–	–	1 734 180	13,2	–	–	294 959	16,1	2 029 139	12,6
July	3 074	3,8	348	4,8	19 849	1,8	610 080	4,7	–		158 165	8,6	788 094	4,9
August	16 112	19,9	190	2,6	66 167	6,2	228 576	1,7	–	–	10 481	0,6	305 224	1,9
September	10 626	13,1	188	2,6	151 174	14,1	152 799	1,2	–	–	20 683	1,1	324 656	2,0
October	869	1,1	19	0,3	2 030	0,2	126 480	1,0	–	–	–	–	128 510	0,8
November	80	0,1	–	–	–	–	87 857	0,7	–	–	–	–	87 857	0,5
December	263	0,3	46	0,6	–	–	122 853	0,9	–	–	–	–	122 853	0,8
Total (1993)	80 826	100,1	7 222	99,8	1 073 132	100,0	13 097 041	100,0	117 626	100,0	1 837 122	100,0	16 124 921	100,1
Percentage						6,7		81,2		0,7		11,4		100,0
Total (1992)	103 498		8 843		887 318		15 330 417		40 996		573 853		16 832 584	
Percentage						5,3		91,1		0,2		3,4		100,0

* Cartons produced in 1993 were converted to mass: 105 209 cartons anchovy and 11 532 cartons chub mackerel of Tall size cans were estimated to contain 10,2 kg of fish each, 1 408 284 cartons pilchard and 197 540 cartons round herring of Tall, Buff and Jitney size cans were estimated to contain on average 9,3 kg of fish each

trial processing and allocated to individual factories and boat-owners, the remainder being for by-catches in anchovy fishing.

Round-herring catches reached 56 331 t and ranked second after those of anchovy (Table XVI). The round-herring resource is considered to be underutilized and is therefore not being subjected to catch restrictions. Even though catches have been increasing in the past two years, the problem of catching round herring efficiently remains unresolved and limits the extent to which the stock is being exploited.

The percentage of other species caught has increased from 1 in the previous year to 4. Mackerel catches remained at a low level, but horse mackerel increased from 1 968 t in 1992 to 11 646 t (Table XVI), which is remarkable for a resource that has only yielded an average annual catch of 3 700 t since 1970.

3.11.2 PRODUCTION

IN keeping with the lower landings, the production of fish meal dropped from 103 498 t in 1992 to 80 826 t (Table XVII). The reduction factor (the tonnage of raw fish required to produce a ton of meal) has remained constant at 4,2 since 1991 and is better than the 4,3 of 1990. This good yield has been obtained even though in the calculation landings have since 1990 included those of the so-called bait boats (canned production has been subtracted all along).

The production of fish body oil likewise decreased from the already low 8 843 t of 1992 (Table XVII) and 8 686 t of 1991, but was better than the 3 725 t of 1990, the lowest ever recorded. The oil yield (expressed as a percentage of meal production) has also been at record low levels in recent years. The percentage was 8,9 (in 1993), 8,5 (1992), 15,7 (1991) and 6,7 (1990) in comparison with an average yield of more than 20 in each decade since 1970. These low yields are ascribed primarily to poor fish condition, but also to the small size of the anchovy and of the sizable pilchard by-catch landed. This was particularly the case in 1993 as discussed under Catch.

Canned production has topped 10 000 t since 1984 and reached 19 300 t in 1990. These levels were last attained in the 1950s and early 1960s when pilchard, horse mackerel and chub mackerel formed the basis of canning. Pilchard was the mainstay of canning during the 1980s, constituting 57% of canned production on average. In the 1990s its contribution has risen to an average of 88%. Canned pilchard was 15% lower in 1993 than in 1992 (Table XVII), but it must be borne in mind that the allocation for directed catches (meant to be canned) of 24 206 t was lower than that for 1992 (27 000 t). Production of canned pilchard began to increase once again after the opening of a canning line at Gans Bay Marine in 1978 and particularly after the setting of a separate pilchard *TAC* in 1984, followed soon by an allocation for directed catches and the fitting-out of some vessels with refrigeration and chilling facilities to keep the catch fit for canning. For the other quota species, anchovy, canned production improved by 21% over 1992 (Table XVII) in spite of the lower catch and was far better than the 206 t in 1991 and the 329 t in 1990, which had been the lowest since the start of anchovy canning in 1978. However, the figures for anchovy canning in the 1990s are much lower than the average for the 1980s of 3 311 t. The higher catch of round herring (Table XVI) led to an increase to second place in its canned production (Table XVII). In 1992 and 1991 canned production of round herring had been the lowest since 1983 from catches that were not below average. Canning of this species commenced in 1967 at a low level, but better use was made of this resource in the latter part of the 1980s when an annual average of 3 006 t was canned. Horse mackerel was canned by pelagic factories for the first time since 1973 when 16 t was produced, but the 118 t of 1993 (Table XVII) is little when compared, for instance, with the period 1961–1964 when a mean of 4 560 t was canned.

3.11.3 FISHING FLEET

THERE were 113 purse-seiners with 137 pelagic permits at the end of the pelagic permit season (31 December) in comparison with 115 with 138 permits in 1992 (Table XVIII).

The number of privately owned vessels (P_2) remained constant at 18, but the 55 factory-owned vessels (P_3) were 2 fewer than in 1992, resulting in a drop of purse-seiners traditionally delivering to factories of 2 to 73. The permits to catch anchovy for direct human consumption, introduced in 1992, increased from 19 to 21. The number of vessels permitted to purse-seine primarily for dead bait decreased by 2 to 32, but those permitted to catch live bait for tuna-fishing rose by one to 11.

Most (91 in 1993 and 93 in 1992) pelagic vessels held a single purse-seining permit. Of the remainder, 20 in each year held two such permits and two in 1993 and one in 1992 had three. In both years only five P_4-vessels had single permits, the remainder being coupled to the established pelagic permit types — mostly with M, but also with P_2 and P_3 and one in each year with Z. The

Table XVIII: Permits issued to licensed South African privately owned (P_2) and factory-owned (P_3) vessels to purse-seine pelagic fish for factory processing, dead (M) and live (Z) bait and to catch anchovy for human consumption (P_4), as well as to line-fish as at the end of the pelagic permit year (31 December) in 1993 and 1992*

Permit type/ Registration area†	PNA	ADF	PQ	SH	SBH	CTA	HTB	KB	C	DDF	KN	PEA	Total boats	Total pelagic permits
One pelagic permit														
P_2	–	–	4	1	–	–	1	–	–	5	–	–	11	
P_3	–	–	5	12	7	1	2	–	–	–	–	–	27	
P_4	2	–	–	–	–	–	–	–	–	–	–	–	2	
Subtotal	2	–	9	13	7	1	3	–	–	5	–	–	40	40
P_2A	–	–	–	–	–	–	–	–	–	1	–	–	1	
P_2B	–	–	–	–	–	–	–	–	–	1	–	–	1	
P_3B	–	8	–	–	–	–	–	–	–	–	–	–	8	
P_3T	–	–	–	6	–	–	4	–	–	–	–	–	10	
P_4B	–	1	–	–	–	–	–	–	–	–	–	–	1	
MA	–	–	–	–	–	1	–	2	–	–	–	–	3	
MB	–	–	–	1	–	–	–	–	–	–	–	–	1	
ZB	–	–	–	–	–	1	–	–	–	–	–	–	1	
ZT	–	–	–	–	–	–	1	–	–	–	–	–	1	
Subtotal	–	9	–	7	–	2	5	2	–	2	–	–	27	27
P_3BT	–	–	–	1	–	–	–	–	–	–	–	–	1	
P_4BT	–		–	–	–	1	–	–	–	–	–	1	2	
MAT	–	–	–	–	–	–	3	3	–	–	–	2	8	
MBT	–	–	–	–	–	5	1	–	–	–	–	–	6	
ZAT	–	–	–	–	–	–	1	–	–	–	–	1	2	
ZBT	–	–	–	–	–	2	2	–	–	–	–	1	5	
Subtotal	–	–	–	1	–	8	7	3	–	–	–	5	24	24
Total one pelagic permit	2	9	9	21	7	11	15	5	–	7	–	5	91	91
Two pelagic permits														
P_2P_4		–	–	1	–	–	–	–	–	–	1	–	–	2
P_3P_4		–	–	1	1	–	–	–	–	–	–	–	–	2
P_3M	–	–	1	–	–	–	–	–	–	–	–	–	1	
Subtotal	–	–	3	1	–	–	–	–	–	1	–	–	5	10
P_3MT		–	–	–	–		–	1	–	–	–	–	–	1
P_3ZT		–	–	–	1	–	–	–	–	–	–	–	–	1
P_4MA		–	–	–	–	–	–	–	–	1	–	–	–	1
P_4MB		–	–	1	–	–	–	–	–	–	–	–	–	1
Subtotal	–	–	1	1	–	–	1	–	1	–	–	–	4	8
P_2P_4BT		–	–	–	1	1	–	–	–	–	–	–	–	2
P_3MBT		–	1	–	1	–	–	–	–	–	–	–	1	3
P_4MBT		–	–	–	2	–	1	–	–	–	1	–	1	5
P_4ZBT		–	–	–	–	–	1	–	–	–	–	–	–	1
Subtotal	–	1	–	4	1	2	–	–	–	1	–	2	11	22
Total two pelagic permits	–	1	4	6	1	2	1	–	1	2	–	2	20	40

Table XVIII: *(continued)*

Permit type/ Registration area†	PNA	ADF	PQ	SH	SBH	CTA	HTB	KB	C	DDF	KN	PEA	Total boats	Total pelagic permits
Three pelagic permits														
P_2P_4M	–	–	1	–	–	–	–	–	–	–	–	–	1	
P_3P_4M	–	–	–	1	–	–	–	–	–	–	–	–	1	
Total three pelagic permits	–	–	1	1	–	–	–	–	–	–	–	–	2	6
All permits (1993)														
Pelagic only	2	–	13	15	7	1	3	–	–	6	–	–	47	
Pelagic + A	–	–	–	–	–	1	–	2	1	1	–	–	5	
Pelagic + B	–	9	1	1	–	1	–			1	–	–	13	
Pelagic + T	–	–	–	7	–	–	6	–	–	–	–	–	13	
Pelagic + AT		–	–	–	–	–	4	3	–	–	–	3	10	
Pelagic + BT	–	1	–	5	1	10	3	–	–	1	–	4	25	
Total pelagic boats (1993)	2	10	14	28	8	13	16	5	1	9	–	7	113	
Total pelagic permits (1993)	2	11	20	36	9	15	17	5	2	11	–	9		137
All permits (1992)														
Pelagic only	2	–	11	17	7	1	1	–	–	8	–	–	47	
Pelagic + A	–	–	–	–	–	–	–	2	–	1	–	–	3	
Pelagic + B	–	8	–	2	–	–	1	–	–	–	–	–	11	
Pelagic + T	–	–	–	5	2	–	9	–	–	–	–	1	17	
Pelagic + AT	–	–	–	–	–	2	2	3	1	–	1	3	12	
Pelagic + BT	–	1	1	5	1	9	2	–	–	2	–	4	25	
Total pelagic boats (1992)	2	9	12	29	10	12	15	5	1	11	1	8	115	
Total pelagic permits (1992)	2	10	16	38	11	15	15	5	2	13	1	10		138

* The figures presented are not comparable with those in the previous Review because they now reflect the position at the end of the pelagic permit year instead of over the full calendar year. The linefishing permits held by pelagic vessels are as halfway through the linefishing permit years 1993/94 and 1992/93 when they should all have been renewed and are also not comparable with earlier figures presented or with other listings in the present Review because they reflect the position at various periods and dates

† The codes for registration areas are explained in Table III and those for linefishing in Table XIX

triple permits involved P_4, P_3 and M in both years and also P_4, P_2 and M in 1993.

The presentation of the pelagic fleet has this year been improved by providing details of the linefishing permits held by purse-seiners. The permits are as on the last day of the calendar year (the end of the pelagic permit year, but halfway through the linefishing permit year). In both years 47 purse-seiners had pelagic permits only, 15 held A-permits, but only one (at Gans Bay) was a vessel delivering to a pelagic factory. In 1993, 38

purse-seiners also held a B-permit and in 1992, 36. In the respective years 13 and 17 vessels had a tuna permit only in addition to any pelagic permits they had. Most of the vessels with A- or B-permits also held a tuna-fishing permit.

As explained in the previous review, vessels permitted to purse-seine for live bait use their catch at sea to attract tuna and therefore do not submit catch statistics. Many of those allowed to catch pelagic fish under the so-called dead-bait allocations have their fish caught by other vessels. The result was that only 87 boats, including dead-bait boats, fished in 1992 and 88 in 1993 and provided catch and effort data. Excluding so-called dead-bait boats, the fleet traditionally supplying factories increased by one to 71 in 1993. If vessels actually fishing and permitted to fish are compared, five in 1992 and two in 1993 did not exercise their right to deliver to factories.

In both years some two-thirds of the purse-seiners delivering to factories were 20–23 m long (range 19–35 m) and had hold capacities of between 100 and 150 t (range 80–350 t, with one vessel of 400 t). The dead-bait boats, which also increasingly deliver to factories, are smaller, nearly all below 20 m in length and 70 t in hold capacity.

3.12 Linefish

THE way statistics on the linefishing fleet are presented has been improved, with the result that the figures now given are not strictly comparable with those published in previous reviews. However, the trends demonstrated have remained unaltered. The present figures reflect the position on the last day of a linefishing permit year instead of all permits granted during such a year and so obviate the inflation of numbers caused by transfers of ownership which usually result in an additional set of permits being issued.

At the end of the 1992/93 permit year for linefishing there were 3 254 craft with such permits, 154 more than in 1991/92 and 18 more than in 1990/91 (Table XIX). This represented 82%, 80% and 79% of the total licensed fishing fleet in the respective years (see also Table III). These high percentages do not mean that all the craft with linefishing permits catch linefish exclusively because many purse-seiners (see Table XVIII) and rock-lobster fishers on the West Coast also hold B-permits and all squid-jiggers are obliged to hold linefishing permits as well (mostly A-permits — see Table VIII). The number of A-permits has increased from 457 to 478 to 511 since 1990/91, but the number of B-permits showed a decreasing trend, from 2 669 to 2 584 to 2 636. The decrease in vessels with T-permits was more pronounced, from 1 154 to 1 079 to 942 over the period discussed. The trend for total T-permits is repeated for craft holding T-permits in combination with A- or B-permits. The reason for the decreasing trend in T-permits is that new T-permits have not been issued from the 1992/93 permit year and that existing permits that are not renewed are not later re-instated. Holders of A- and B-permits are entitled to catch tuna so that the tuna fishery is not hampered by the phasing-out of specific tuna permits.

There has been a substantial increase in linefishing vessels in Natal from 114 in 1990/91 to 133 in 1991/92 to 159 in 1992/93, particularly of those with commercial (A) permits. The concern over the increased pressure on the reef-fish in that region prompted a moratorium on the transfer of A- and B-permits from the Cape to Natal with the inception of the 1992/93 permit year. These movements are thought to be related to events in the squid-jigging fishery which experienced a poor year in 1992. All squid-fishers are now obliged to have a linefishing permit and can

Table XIX Permits issued to licensed South African commercial (A) and semi-commercial (B) linefishing and tuna (T) fishing vessels as on the last day of the linefishing permit year (30 June) 1992/93, 1991/92 and 1990/91*†

Registration area‡/ Permit type	A	AT	B	BT	T	Total
WB	8	1	1	–	1	11
PNA	–	–	32	2	2	36
HB	–	–	23	–	–	23
VR	–	–	122	–	–	122
ADF	–	–	246	10	–	256
PQ	–	–	252	6	–	258
SH	–	1	181	29	7	218
SBH	–	1	120	23	6	150
CT	1	5	126	77	10	219
CTA	–	4	13	102	18	137
HTB	3	18	19	52	32	124
STH	–	1	9	9	–	19
ST	4	4	161	79	16	264
KB	22	20	13	13	1	69
SW	9	5	133	38	4	189
C	1	1	98	7	–	107
DDF	34	5	64	9	–	112
BR	46	20	91	12	1	170
SM	2	–	19	3	–	24
R	9	–	108	5	1	123
MBA	8	1	11	31	–	51
G	–	1	7	1	–	9
KN	–	7	19	7	–	33
H	12	33	31	48	2	126
PEA	9	34	30	30	4	107
P	26	8	45	8	1	88
ELA	6	1	14	2	–	23
DNA	5	2	15	5	–	27
N	88	45	16	9	1	159
Total 1992/93	293	218	2 019	617	107	3 254
Total 1991/92	233	245	1 838	746	88	3 150
Total 1990/91	243	214	1 868	801	110	3 236

* The figures presented are not comparable with those in previous Reviews because they reflect the position at the end of the permit year whereas previously all permits in a full permit year were presented

† Boats with linefishing permits may also hold permits for other fishery sectors, e.g. squid-jigging (Table VIII) and purse-seining (Table XVIII)

‡ The codes for registration areas are explained in Table III

therefore easily alternate between squid and linefish. In a further effort to halt the increase in A-permits referred to above and to curb the profiteering from the selling of such permits, the transfer of A-permits, except between *bona fide* commercial fishermen with the explicit approval of the Chief Director of Sea Fisheries, was prohibited from 3 November 1992 by the Minister. It is therefore expected that there will be little or no increase in A-permits arising from the splitting of permits.

Splitting (and lumping) has been happening since 1990 when the Sea Fishery Act of 1988 came into effect, allowing the transfer and sale of permits so that permits are not tied to a particular vessel. Vessel numbers, fixed since the beginning of 1985, could

Table XX: Commercial Cape and Natal catches (t) of tuna species reported per catch method

Method	Albacore		Yellowfin		Bigeye		Skipjack		Total	
	1992	1993	1992	1993	1992	1993	1992	1993	1992	1993
Pole	6 306*	4 500	63	257	51	102	5	4	6 425*	4 863
Purse-seine	–	–	–	–		–	–	–	–	
Rod and line	54	35	6	4		–	1	1	61	40
Trawl	–	–	–	–	–		–	–	–	–
Total	6 360*	4 535	69	261	51	102	6	5	6 486*	4 903

* Updated

therefore once again fluctuate. The total number of crew carried by linefishing vessels has, however, remained fixed, and this has become the main method of controlling fishing effort in the linefisheries.

There was a slight decrease in the number of registered commercial linefishing vessels reporting catches to the National Marine Linefish System. Of the 3 254 registered vessels in 1992/93, 2 809 submitted monthly catch returns, reporting a total 87 698 days fished in 1993, practically the same effort as in 1992.

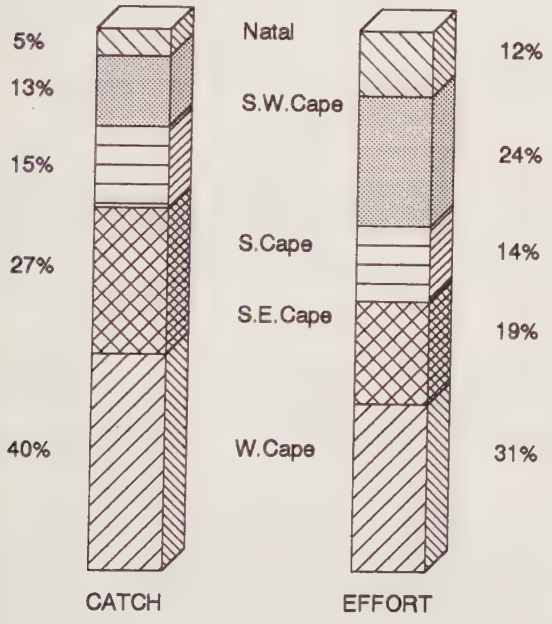


Fig. 5: Distribution of catches and effort around the coast for tuna, squid and fish caught on lines in 1993

After the good catches of almost 6 500 t last year, the total tuna catch declined to 4 863 t, despite substantial increases in the by-catch of yellowfin and bigeye tuna (Table XX). The decline resulted from a 24% decrease in the catch of albacore (longfin) in the pole fishery off the Western Cape and Namibian coasts, to 4 500 t. Assessments suggest that this decline has resulted from a combination of a general decline in the southern Atlantic stock and a reduced availability in South African waters.

The 2 809 vessels submitting returns reported a total national commercial catch of 8 904 t of linefish, excluding squid and tuna, during 1993, a 28% decrease over 1992. This decrease resulted from a 31% drop in landings in the Cape, down to only 7 841 t (Table XXI), in contrast to the slight increase in Natal and Transkei catches to 1 063 t (Table XXII). The distribution of handline as well as jigging catches and effort along the coast is shown in Figure 5. Because all squid-jigging vessels are nowadays required to also obtain a permit for handline-fishing and because they switch effort between the two types of operation it is not possible to assign fishing effort per fishery. Figure 5 therefore includes squid data as in the past. The effect of a trebling of the squid catch by jigging in 1993 in the South-East Cape and of the lower catch in particularly the Western Cape is evident from the figure.

Table XXI: Total reported Cape catch (to the nearest 100 kg) of linefish

Locality	Snoek	Yellowtail	Kob	Geelbek	Carpenter (Silverfish)	Roman	Red steenbras	Red stumpnose	Dageraad
Port Nolloth	55 500	2 900	–	–	–	–	–	–	–
Doring Bay	16 800	16 300	–	–	–	–	–	–	–
Lambert's Bay	316 100	1 500	–	–	–	–	–	–	–
Elands Bay	104 800	–	–	–	–	–	–	–	–
Laaiplek	2 600	–	400	–	–	–	–	–	–
St Helena Bay	606 500	6 800	–	–	–	–	–	–	-
Saldanha Bay	8 400	600	2 200	–	–	100	–	–	–
Yzerfontein	360 400	15 700	–	100	–	–	–	–	–
Cape Town	144 800	600	–	–	–	–	–	–	–
Hout Bay	550 300	1 500	–	–	–	100	–	–	–
Kommetjie	333 900	79 700	500	5 400	500	2 500	–	100	–
Kalk Bay	34 200	36 400	54 600	9 700	1 900	10 500	–	400	–
Gordon's Bay	89 000	15 000	84 400	88 500	21 600	16 800	400	1 900	–
Hermanus	3 500	1 100	6 500	11 700	14 400	2 000	–	100	–
Gans Bay	37 800	211 400	74 700	102 500	106 300	25 800	700	3 000	–
Struis Bay	18 200	367 300	27 900	59 200	64 000	8 200	16 900	1 000	–
Waenhuiskrans (Arniston)	90 500	30 100	42 500	27 700	79 000	4 500	19 900	500	100
Still Bay	–	3 100	346 400	4 300	18 300	9 100	600	1 200	900
Mossel Bay	–	1 800	44 200	200	37 800	5 300	500	500	300
Plettenberg Bay	62 300	1 900	5 700	8 700	48 300	8 300	5 500	4 100	200
Jeffreys Bay	1 700	100	17 400	2 500	60 000	3 200	1 300	900	4 300
Port Elizabeth	300	14 500	61 800	35 200	122 300	8 500	800	3 800	8 700
Port Alfred	500	6 400	76 100	41 700	78 400	5 100	7 500	2 100	11 500
East London	–	200	6 000	14 100	32 400	600	21 300	2 100	6 900
Total (1993)	2 758 000	814 900	851 300	411 500	685 200	110 500	75 400	21 700	32 900
Total (1992)*	5 651 400	588 000	829 100	372 800	873 100	138 200	92 500	24 700	41 600

* Updated
† Mainly baardman, blue hottentot, butterfish, flathead, Fransmadam, gurnard, horse mackerel, jacopever, kingklip, knifejaw,
‡ Includes 9 557 kg of steentjie in 1993 at Saldanha

Table XXII: Total reported catch (to the nearest 100 kg) of linefish species by

Locality	Kobs†	Geelbek	Slinger	Santer	Blueskin	Englishman	Scotsman	Emperor	Seventy-four
				*1992**					
Transkei	8 300	5 600	4 600	1 000	–	1 300	1 100	–	200
Southern Natal	24 600	129 100	156 900	24 100	27 900	41 500	10 300	2 900	1 200
Northern Natal	136 300	21 500	147 300	45 700	35 500	8 200	500	1 200	500
Total	169 200	156 200	308 800	70 800	63 400	51 000	11 900	4 100	1 900
				1993					
Transkei	8 500	6 200	3 700	1 000	–	800	1 300	–	200
Southern Natal	48 300	171 100	112 700	26 000	13 000	30 500	8 400	3 400	1 600
Northern Natal	103 500	12 600	177 000	55 900	37 600	8 800	200	1 000	700
Total	160 300	189 900	293 400	82 900	50 600	40 100	9 900	4 400	2 500

* Updated
† Includes kob and squaretail kob
‡ Includes dageraad, Dane, king soldier and sand soldier
§ Mainly blue hottentot, carpenter (silverfish), dolphinfish, German, grunter, kingfish, rubberlip, seacatfish (barbel), yellow-

species (tunas excluded) by registered commercial boats in 1992* and 1993

Santer	Hottentot	Chub mackerel	Sharks	Panga	White stumpnose	Elf	Hake	Kingklip	Other†	Total
–	300	–	–	–	–	–	–	–	–	58 700
–	1 900	–	400	–	–	–	–	–	1 300	36 700
–	23 900	–	1 100	–	–	–	300	–	200	343 100
–	6 100	–	–	–	–	–	–	–	5 500	116 400
–	9 500	–	2 000	–	400	–	–	–	1 300	16 200
–	50 600	–	3 100	–	200	–	300	–	500	668 000
–	163 100	–	3 200	–	63 600	400	100	–	12 000‡	128 400
–	66 700	200	4 700	–	–	–	–	–	1 400	545 600
–	14 500	–	4 700	700	–	–	–	–	1 400	218 900
–	106 900	–	700	–	–	–	–	–	400	567 500
–	20 800	23 900	18 100	2 600	700	200	100	100	2 400	577 600
100	40 700	1 800	31 500	10 200	47 300	22 400	–	–	10 300	292 000
–	5 100	5 500	3 600	32 200	11 800	34 200	300	–	16 500	382 400
–	53 000	1 800	10 500	800	–	–	–	–	500	58 000
400	100	19 700	295 800	600	2 100	4 400	100	–	9 200	947 100
12 400	–	800	30 600	100	100	1 300	300	–	2 700	599 100
8 500		200	28 900	900	–	100	300	–	1 900	339 500
500	–	600	52 800	3 200	100	200	6 600	–	–	455 900
1 600	–	1 700	17 600	300	–	300	10 600	300	1 400	126 300
9 500	–	11 200	4 100	8 000	–	200	163 200	11 700	1 500	345 400
16 300	–	11 500	1 000	61 000	–	–	39 900	500	1 600	208 500
1 200	400	21 000	–	2 000	48 600	200	900	339 700		
100	700	102 300	–	100	2 900	–	6 100	357 800		
1 300	–	–	–	17 200	100	–	100	–	9 500	111 800
54 100	601 100	80 200	515 500	261 100	126 400	65 800	273 700	12 800	88 500	7 840 600
59 700	489 800	34 000	459 000	272 900	128 200	40 800	1 091 100	45 800	105 800	11 271 700

rock-cod, seacatfish (barbel), steentjie and wreckfish

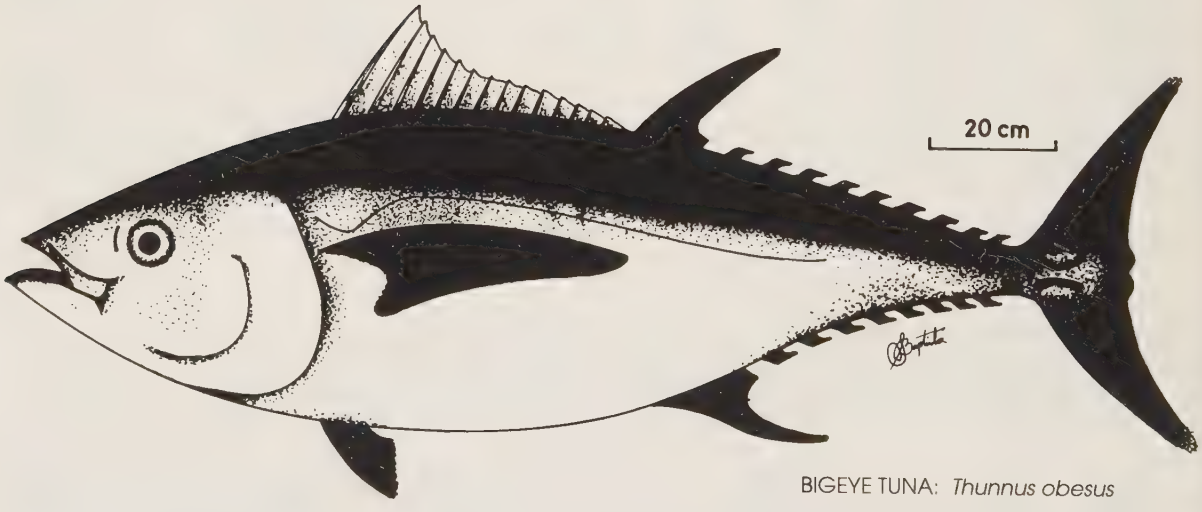
registered commercial boats fishing off Transkei and Natal in 1992 and 1993

Red steenbras	Unspecified redfish‡	King mackerel	Queen mackerel	Yellowtail	Poenskop (Black musselcracker)	Rock-cods	Other§	Total
				*1992**				
300	100	100	–	100	1 000	1 900	2 100	27 700
900	5 100	5 500	200	3 000	6 400	30 900	39 700	510 200
300	6 300	16 800	2 200	–	2 200	44 800	23 100	492 400
1 500	11 500	22 400	2 400	3 100	9 600	77 600	64 900	1 030 300
				1993				
300	100	300	–	900	1 200	1 700	1 800	28 000
400	5 500	32 500	100	500	5 000	23 500	46 900	529 400
400	3 600	21 200	2 400	–	1 700	53 200	25 800	505 600
1 100	9 200	54 000	2 500	1 400	7 900	78 400	74 500	1 063 000

tail fusilier (protea) and unspecified fish species

Fig I

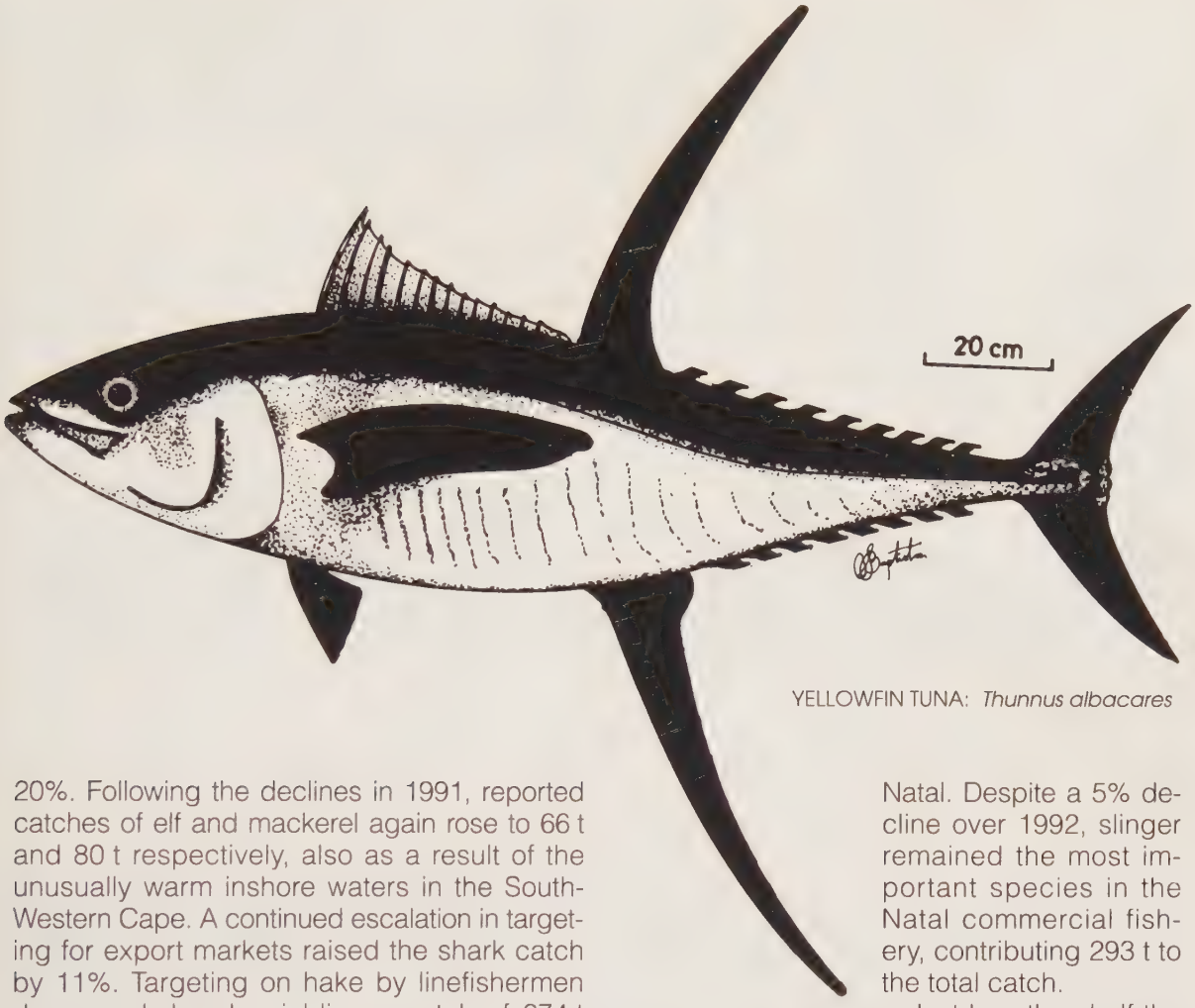
LONGFIN TUNA: *Thunnus alalunga*



BIGEYE TUNA: *Thunnus obesus*

Three tuna species commonly caught in the pole fishery on the West Coast

The lower commercial catch resulted mainly from a 51% decrease in catches of snoek in the Cape, to only 2 758 t (Table XXI), the lowest contribution by snoek to the Cape catch in many years. The kob catch remained constant, but the good 1992 catches of carpenter were not repeated, and the catch of this species fell by 22%. In contrast, catches of yellowtail increased significantly to 815 t as shoals of this species moved back from the West Coast to their more usual Agulhas shoaling areas. Unusually warm water resulted in particularly high catches of this species in False Bay. Catches of redfish declined by an average of



YELLOWFIN TUNA: *Thunnus albacares*

20%. Following the declines in 1991, reported catches of elf and mackerel again rose to 66 t and 80 t respectively, also as a result of the unusually warm inshore waters in the South-Western Cape. A continued escalation in targeting for export markets raised the shark catch by 11%. Targeting on hake by linefishermen decreased sharply, yielding a catch of 274 t only, as negotiations to allocate a part of the hake *TAC* to longline fishermen continued. The related kingklip by-catch also dropped, to approximately 12 t.

In Natal and Transkei, the reported commercial catch improved slightly to 1 063 t, despite a 20% reduction in catches of most redfish species, and a very poor yellowtail run to Natal (Table XXII). The increased catch resulted from strong runs of geelbek from the Cape and king mackerel from Moçambique into Natal waters. Good catches of santer and seventy-four were also made in southern Natal. Despite a 5% decline over 1992, slinger remained the most important species in the Natal commercial fishery, contributing 293 t to the total catch.

Just less than half the reported linefish catch was landed at fishing harbours from Port Nolloth to Still Bay (Table XXIII). In contrast to the previous few years, when the most important harbours were Yzerfontein and St Helena Bay, the largest landings were made at Hout Bay, followed by St Helena Bay and Yzerfontein. This resulted from the general southward displacement of the snoek stock into the warm water off the South-Western Cape, with part of the Hout Bay landings being made by large vessels fishing the offshore Agulhas Bank. The southward displacement of snoek also resulted in good

Table XXIII: Total reported Cape landings (to the nearest 100 kg) of linefish

Locality	Snoek	Yellowtail	Kob	Geelbek	Carpenter (Silverfish)	Roman, Red stumpnose, Santer	Red steenbras, Dageraad, 74
Port Nolloth	21 000	–	–	–	–	–	–
Doring Bay	20 800	–	–	–	–	–	–
Lambert's Bay	155 100	–	–	–	–	–	–
Elands Bay	19 600	–	–	–	–	–	–
Laaiplek	800	–	–	–	–	–	–
St Helena Bay	955 800	–	–	–	–	–	–
Saldanha	200	–	800	–	–	–	–
Yzerfontein	487 000	5 400	–	–	–	–	–
Hout Bay	890 100	53 300	–	3 800	27 200	–	16 400
Kommetjie	29 100	–	–	–	–	–	–
Kalk Bay	186 800	47 400	19 000	3 700	1 400	4 600	–
Gordon's Bay	3 300	7 800	31 000	32 400	7 500	6 800	–
Hermanus	–	6 200	300	1 700	55 900	200	300
Gans Bay	–	400	800	10 800	400	100	–
Waenhuiskrans (Arniston)	–	19 700	31 700	25 500	3 700	24 700	10 600
Still Bay	–	1 400	258 400	3 800	3 000	9 300	400
Total (1993)	2 769 700	141 600	342 000	81 700	99 100	45 700	27 700
Total (1992)	4 978 200	48 200	271 500	69 700	121 300	66 300	24 300

* Includes the same species as the Cape commercial catch summary

Table XXIV: Total reported catch (to the nearest 100 kg) of linefish

Locality	Kobs*	Geelbek	Slinger	Santer	Leervis	Green jobfish	Unspecified redfish†
			*1992**				
Southern Natal	100	–	200	100	–	–	–
Northern Natal	9 700	900	3 400	1 500	400	1 400	1 100 600
Total	9 800	900	3 600	1 600	400	1 400	1 100
			1993				
Southern Natal	–	–	–	–	–	–	–
Northern Natal	1 300	100	4 100	1 800	300	1 800	700 600
Total	1 300	100	4 100	1 800	300	1 800	700

* Updated
** Includes kob, mini-kob and squaretail kob
† Includes dageraad, Dane, false Englishman, seventy-four and unspecified redfish species
‡ Includes black marlin, blue marlin, striped marlin and sailfish
§ Includes eastern little tuna, skipjack, yellowfin tuna and unspecified tunas
¶ Mainly blueskin, brindle bass, elf, Englishman, kingfish, musselcracker, poenskop, prodigal son, queenfish, Scotsman,

species at fishing harbours in 1992 and 1993 (excluding tuna)

	Hottentot	Chub mackerel	Sharks	Panga	White stumpnose	Elf	Hake	Other*	Total
	100	–	–	–	–	–	–	–	21 200
	9 800	–	–	–	–	–	–	–	30 600
	12 700	–	–	–	–	–	–	–	167 800
	4 000	–	–	–	–	–	–	5 600	29 200
	400	–	–	–	–	–	–	–	1 200
	–	–	–	–	–	–	–	–	955 800
	8 200	–	–	–	20 700	–	–	500	30 400
	237 600	–	–	–	–	–	–	–	730 000
	–	1 000	–	–	–	–	–	700	992 500
	17 800	–	–	–	–	–	–	700	47 600
	52 100	10 400	–	7 900	22 900	7 300	–	13 000	376 500
	8 800	700	–	10 300	1 100	7 400	–	1 900	119 000
	–	400	–		–	–		–	65 000
	500	–	1 600	–	–	–	–	–	14 600
	–	–	25 900		–	–	–	–	141 800
	–	100	36 400	2 300	100	100	3 400	900	319 600
	352 000	12 600	63 900	20 500	44 800	14 800	3 400	23 300	4 042 800
	134 800	200	95 100	4 900	24 400	7 500	4 300	13 600	5 864 300

species by recreational skiboats in Natal in 1992* and 1993

	King mackerel	Queen mackerel	Rock-cods	Sharks	Dolphinfish	Billfish‡	Tunas§	Other¶	Total
					*1992**				
	400	–	200	–	–	–	100	400	1 500
	47 400	6 600	9 100	6 600	13 300	22 500	27 000	18 400	169 300
	47 800	6 600	9 300	6 600	13 300	22 500	27 100	18 800	170 800
					1993				
	1 000	–	–	–	–	–	400	200	1 600
	39 100	2 600	7 800	7 600	12 800	13 100	13 700	14 400	121 200
	40 100	2 600	7 800	7 600	12 800	13 100	14 100	14 600	122 800

snapper kob, stumpnose, wahoo and unspecified fish species

snoek landings at Kalk Bay. Yzerfontein remained the most important landing area for the higher hottentot catch. On the South Coast, Still Bay became even more important as a landing site for kob, receiving 40% of the national catch. It is therefore not surprising that this area has become the centre of conflict between commercial linefishermen, recreational anglers and inshore trawlers fishing for kob.

Recreational fishermen reported some 32 260 fishing days to the National Marine Linefish System during 1992 and some 28 500 during 1993 under a data collection contract with the Oceanographic Research Institute in Natal. The most important sources of data remained recreational skiboat cards (respectively about 12 800 and 9 350 days fished), shore-angling cards (some 6 700 and 6 400 days), light-tackle cards (about 6 500 and 5 500 days) and shore patrols conducted by the Natal Parks Board (5 730 and 6 150 patrols) in the respective years. These data are thought to represent just over half of the recreational fishing effort in Natal. Recreational data for the Cape remain inadequate.

Only the recreational skiboat catch off Natal is recorded here. There seems to have been considerable under-reporting in 1993 because only about 9 350 days fished were recorded in comparison with 12800 in 1992 (27% fewer), 10 900 in 1991 and 11 509 days in 1990. The total reported recreational skiboat catch off Natal was 28% lower than the above-average catch of 1992 (Table XXIV), but slightly above that of 1991, the lowest since 1985. The catches of all categories were lower in 1993 except sharks, green jobfish, slinger and santer, for which moderate increases were reported. Greater targeting by recreational skiboats on reef fish such as slinger and santer was also noted last year. The greatest decreases occurred for traditional game species such as billfishes and tunas (Table XXIV), but the drop for dolphinfish and king mackerel, the mainstay of this fishery, was more moderate. The recreational boats therefore did not share in the good run of king mackerel reported by commercial boats. The good kob run of the previous year was not repeated.

3.13 Mullet and St Joseph

THE number of permit-holders of beach-operated nets increased by 4 to 447 in 1993 and that of registered nets by 6 to 918 (Table XXV). However, these figures are not comparable with those previously published as they represent the counts at the end of the permit year; permits that did not run for the full year (mostly because of transfers of ownership) are not included. The total numbers also exclude the free "ration-fish nets" granted at first to six shore owners in 1992 and increased to seven in 1993 (Table XXV). As in the past all the permits for driftnets and half of the beach-seine permits were awarded on the West Coast from Langebaan northwards. As explained in the footnotes to Table XXV, driftnet permits do not distinguish between small-meshed nets for mullet-fishing and large-meshed nets for catching St Josephs, but catch returns show that 45 large-meshed driftnets were in use, mainly from Paternoster to the southern part of St Helena Bay.

The total catch of mullet (harder) increased by 41% to 5,3 million fish (about 1 328 t). In areas between the Orange River and the Palmiet River mouth, and between Struis Bay and Still Bay, increases ranged from 19 to 88%, while all other areas showed decreases ranging from 18 to 43%. The most productive area, that between Elands Bay and Langebaan, contributed 66% of the total mullet catch (Table XXV).

Total fishing effort increased by 20%, resulting in an increase of 66% in the by-catch to 438 t (Table XXVI). St Joseph and yellowtail again dominated the by-catch and contributed 71% and 17% to it respectively.

Table XXV: Geographical distribution of beach–operated net permits, permit holders and mullet catches (as at 31 December)

Areas	Region	Number of permit holders*		Registered drift and beach-seine nets*		Number of mullet caught		Percentage of beach-seine catch	
		1992**	1993	1992**	1993	1992	1993	1992	1993
3–6	Orange River to Lambert's Bay	46 (2)	47 (2)	50 (2)	51 (2)	58 717	69 705	1,6	1,3
7–12	Elands Bay to Langebaan	301 (3)	306 (4)	746 (3)	751 (4)	1 958 780	3 471 820	52,7	66,2
13–17	Yzerfontein to Kommetjie	25	23	26	26	277 936	521 997	7,5	10,0
18–23	Simonstown to Kleinmond	12	12	23	23	1 005 178	824 276	27,1	15,7
24–27	Kleinmond to Cape Agulhas	27	27	32	32	282 267	179 363	7,6	3,4
28–32	Cape Agulhas to Still Bay	23	24	26	27	89 115	149 518	2,4	2,9
33–34	Mossel Bay to Buffels Bay	2	2	2	2	41 575	23 778	1,1	0,5
35	Port Elizabeth	1 (1)	– (1)	1 (1)	– (1)	–	–	–	–
	Subtotal (Areas 3–35)	437 (6)	441 (7)	906†(6)	912†(7)	3 713 569	5 240 457	100,0	100,0
1	Walvis Bay	6	6	6	6	53 424	73 005		
	Total (numbers)	443 (6)	447 (7)	912†(6)	918†(7)	3 766 992	5 313 462		
	Total (kg mass)‡					941 751	1 328 366		

* Shore-owners and the number of free "ration-fish" nets granted to them are shown in parenthesis
** Updated
† Permits for drift nets allow holders to use either a small-meshed mullet drift net or a large-meshed St Joseph net with the same licence plate, thus theoretically doubling the 742(2) and 748 (3) drift nets of those permit-holders in 1992 and 1993 respectively; in fact only 45 large-meshed drift nets were in use in the area between Elands Bay and Langebaan in each year
‡ Mass is obtained by dividing number of fish by 4

Table XXVI: Species other than mullet caught in drift, beach-seine and shark gillnets

Species	Catch (kg)	
	1992	1993
St Joseph (Elephantfish)	179 700	309 214
Soupfin shark (Vaalhaai)	7 591	1 788
Skates and Rays	18 939	26 403
Unspecified sharks	2 020	8 558
Baardman	349	555
Elf	1 670	3 502
Horse mackerel (Maasbanker)	201	5 896
Kob	4 578	2 322
Pilchard (Sardine)	3 352	20
Seacatfish (Barbel)	302	1 007
Strepie	174	364
White steenbras	10 816	3 585
White stumpnose	129	91
Yellowtail	33 698	73 347
Other fish*	1 028	1 467
Total	264 547	438 119

* Blacktail(dassie), garrick(leervis), grunter, gurnard, hottentot, musselcracker, sand steenbras, sole, springer (flathead mullet), steentjie, zebra and unspecified bony fish

3.14 Demersal fish

EXPLOITATION of demersal fish in South Africa is carried out by different fishing techniques and by several sectors around the coast. The deep-sea trawl industry, based in the Western Cape, is the largest of these sectors and is followed by the much smaller inshore fishery based on the Cape south and east coasts. Several even smaller fisheries also exist. The midwater fishery directed at horse mackerel, although governed by separate permits and quotas, is closely linked to the deep-sea trawl sector. On the West Coast, the experimental exploitation of West Coast sole out of Port Nolloth and a second fishery in St Helena Bay targeting on gurnards continued.

The bulk of the demersal catch is meant for direct human consumption, but 2 406 t of white fish meal was made at sea in 1992 and 2 426 t in 1993. Land-based production of

Table XXVII: Nominal (live) mass of bottom- and midwater-trawled fish, cephalopods and crustaceans landed in South Africa for South African quota-holders

Species	1992		1993*			
			West Coast	South Coast	Total	
	tons	%	tons	tons	tons	%
Cape hakes	135 179	61,8	98 110	43 089	141 199†	65,7
Kingklip	2 224	1,0	1 579	1 060	2 657	1,2
Soles	834	0,4	45	746	809	0,4
Kob (Kabeljou)	153	0,1	0	167	167	0,1
Panga	581	0,3	6	735	741	0,3
Other reds	41	0,0	22	36	58	0,0
Carpenter (Silverfish)	7	0,0	0	11	11	0,0
Pomfret (Angelfish)	868	0,4	1 545	171	1 716	0,8
Gurnards	676	0,3	565	445	1 010	0,5
Jacopevers	1 229	0,6	1 188	290	1 478	0,7
John Dory	1 103	0,5	675	429	1 104	0,5
Horse mackerel	31 709	14,5	3 590	20 725	24 315	11,3
Skates	1 272	0,6	32	1 052	1 084	0,5
White stumpnose	6	0,0	0	15	15	0,0
Snoek	12 869	5,9	9 214	3 305	12 519	5,8
Monk	4 858	2,2	3 408	873	4 281	2,0
Sharks and St Joseph	557	0,3	454	384	838	0,4
Chub mackerel	4 139	1,9	287	4 047	4 334	2,0
Buttersnoek (Ribbonfish)	14 227	6,5	5 649	6 575	12 224	5,7
Souther rover (Bonnetmouth, Red mullet)	418	0,2	357	74	431	0,2
Red squid	300	0,1	37	22	59	0,0
White squid	256	0,1	10	268	278	0,1
Octopus	122	0,1	122	27	149	0,1
Pilchard	26	0,0	0	1	1	0,0
Other	241	0,1	162	243	405	0,2
Subtotal	213 895	97,5 97,7	127 075	84 808	211 883	98,5 98,6
Offal (trash fish)	4 381	2,0			2 512	1,2
Subtotal	218 276	99,7			214 395	99,7
Natal: Crustaceans	500	0,2			486	0,2
Cephalopods	32	0,0			23	0,0
Finfish	58	0,0			45	0,0
Total	218 866	99,9			214 949	99,9

* Masses of 3 056 t of heads and 145 t of roes (mostly hake) landed in 1993 form part of the live mass figure and have not been added in again

† This figure does not include hake landed in early 1994 that was held against the 1993 allocations, nor does it include a "handline" catch of 274 t

white fish meal from offal and damaged fish amounted to 2 058 t and 2 001 t respectively. Most of the demersal fish landed is sold fresh or frozen on the local market, about a third going to the export market, particularly southern European countries. More than 30 000 t are further processed and enhanced by smoking, canning and the preparation of fish fingers and other easily cooked products. Some 2 500 t, particularly horse mackerel, is

salted and dried, being popular as ration fish on farms. Constituting more than 60% of landings, hakes are the most important species, but others caught in lesser quantities such as soles, kingklip, kob and monk have long been much sought after and species such as pomfret (angelfish) and white squid have been gaining in popularity. An uncertain market for the large catches of buttersnoek (ribbonfish) made in recent years has developed in the Far East.

The gradual phasing-out of the foreign fleets continued and in 1993 the only demersal quota issued to any foreign country was 1 000 t of hake awarded for the joint venture with Moçambique in terms of the bilateral fishing agreement. This quota was accommodated within the existing hake *TAC* as was the 1 000 t in 1992 and the 750 t in 1991. This joint venture came in to being as a *quid pro quo* for another joint venture concerning prawns in Moçambique waters. In the hake joint venture the South African partners have to match the Moçambique quota, they catch, process and market the fish and the proceeds are shared.

Another significant development in the industry was the relinquishing of the 80:20 undertaking, which in the past has guaranteed that 80% of any increase in the hake *TAC* would be allocated to "foundation members" in the industry. The number of hake quota-holders also effectively increased in 1993 with the introduction of community trusts (the intention of the community trust hake allocations is to help uplift disadvantaged fishing communities).

A notable feature of the demersal fishery in 1993 was the significantly lower midwater trawl catch. Because of this, the proportion of the total demersal catch caught by the deep-sea trawl industry (214 951 t) increased from 84,1% in 1992 to 88,7% in 1993 (Table XXVII). Although the hake catch rate on the West Coast declined, the overall trend remains positive and there was a further increase in the annual *TAC* for this species.

Only three demersal resources were subject to quota control in 1993, namely the Cape hakes (147 000 t), the Agulhas sole (872 t) and horse mackerel. Because of poor available data, scientists were unable to assess the state of the horse-mackerel stocks in 1993 satisfactorily and no *TAC* was recommended. However, based on the best available information, a precautionary upper catch limit of 55 000 t was set.

3.14.1 DEEP-SEA TRAWL

THE deep-sea sector caught almost 89% of the total reported demersal catch in 1993 (Table XXVII). Hake-directed bottom trawling remained the main objective of the fishery, although increasing effort was directed to other species. The total hake landings approximated 141 000 t (Table XXVIII). Most of the effort on hake was concentrated on the West Coast, where the best catch rates were obtained. Regulations governing the fishery remained unchanged. Deep-sea vessels are restricted to nets of 110 mm stretched mesh on the West Coast, but nets of 75 mm mesh are permitted east of 20°E. On the South Coast (east of 20°E) permit-holders in the deep-sea sector are not allowed to trawl inside the 110-m depth contour. Less effort than normal was directed at the South Coast, where approximately 31% of the total hake catch was taken, compared with 38% in 1992 (Table XXVIII). This figure is calculated using a full calendar year and does not include any carry-overs allowed, such as those for the community trusts or for catches of vessels that sailed in 1993 but only landed their catches in early 1994. Although catches of hake continued to improve, the rate of recovery since the over-exploitation in the early 1970s has been slow. With the number of hake quota-holders increasing, as well as the likelihood of other hake-directed operations developing (such as hake-directed handline

Table XXVIII: Nominal (live) mass of fish landed (t) by different trawling sectors in South Africa in 1992 and 1993

Species	Deepsea	Inshore (South Coast)	Midwater	West Coast sole	West Coast gurnard	Total
Hakes	132 086	8 870	243	–	–	141 199*
Kingklip	2 481	157	10	9	–	2 657
Soles	–	764	–	45	–	809
Kob (Kabeljou)	–	167	–	–	–	167
Panga	122	597	22	–	–	741
Other reds	58	–	–	–	–	58
Carpenter (Silverfish)	1	10	–	–	–	11
Pomfret (Angelfish)	1 704	–	12	–	–	1 716
Gurnards	530	373	–	–	107	1 010
Jacopever	1 478	–	–	–	–	1 478
John Dory	1 102	–	2	–	–	1 104
Horse mackerel	16 222	2 201	5 889	3	–	24 315
Skates	18	1 057	–	9	–	1 084
White stumpnose	–	15	–	–	–	15
Snoek	12 462	50	7	–	–	12 519
Monk	4 174	103	2	2	–	4 281
Sharks and St Joseph	233	480	–	22	103	838
Mackerel	4 257	8	69	–	–	4 334
Buttersnoek (Ribbonfish)	12 114	24	86	–	–	12 224
Southern rover (Bonnetmouth, Red mullet)	431	–	–	–	–	431
Red squid	57	2	–	–	–	59
White squid	75	196	7	–	–	278
Octopus	147	2	–	–	–	149
Pilchard	1	–	–	–	–	1
Other	247	157	1	–	–	405
Subtotal (1993)	190 000	15 233	6 350	90	210	211 883
Percentage	88,7	7,1	3,0	< 0,1	0,1	100,0
Offal (trash fish)						2 512
Total (1993)						214 395
Subtotal (1992)	184 855	17 849	5 978	338	81	219 873
Percentage	84,1	8,1	2,7	0,2	< 0,1	100,0
Offal (trash fish)						4 381
Total (1992)						224 254†

* This figure does not include hake landed in early 1994 that was held against the 1993 allocations nor 274 t caught on lines in 1993, but it does include 4 732 t landed in early 1993 against 1992 allocations

† This figure does not include 4 732 t of hake landed in early 1993 against 1992 allocations nor 1 091 t caught on "lines", but it does include 5 978 t of fish and squid caught by foreign vessels under bilateral agreements

and longline fishing), exploitation pressure on the resource is likely to continue to increase.

Kingklip catches in the trawl fishery showed further signs of recovery since the sharp decline in the resource at the time of the longline exploitation between 1983 and 1990. In 1993, trawl-caught kingklip increased, thereby continuing the positive trend noted since 1991. The kingklip catch was, however, still but a small proportion of the total demersal landings (1,2%), compared with the years preceding longlining when the kingklip catch

approximated 2–3% of the demersal landings. Horse mackerel an important component of the deep-sea catch, although in 1993 they were somewhat lower than in 1991 and 1992 and their share of the total demersal catch decreased by about 3%. Landings of the by-catch species, snoek and monk, were similar to the previous year and those of buttersnoek (ribbonfish) declined slightly. These three species are all subject to seasonal and sporadic targeting by the fishery. Other by-catch species such as pomfret (angelfish), gurnards and jacopever were all higher than in 1992.

3.14.2 INSHORE TRAWL

THIS fishery extends along the Cape south coast and is centred at Mossel Bay and Port Elizabeth and is second only to the deep-sea sector in the trawl fisheries. In 1993 the inshore trawl sector contributed 7,1% of the total demersal nominal catch, a slight decrease from 1992 (Table XXVII). Compared to the deep-sea fleet, which uses wetfish and freezer stern trawlers, the inshore fishery comprises mostly small side trawlers working in waters less than 110 m deep on the Agulhas Bank.

This sector seems to be fairly stable, the only significant change in the catch trends being the decline in the horse-mackerel (maasbanker) catch to 2 200 t from almost 5 000 t in 1992. Catches of horse mackerel tend to be rather variable, depending largely on trends in availability. A slightly larger percentage of the Agulhas sole *TAC* was caught (764 t) than in either 1992 or 1991. The reasons for the sole quotas not being filled are not entirely clear but have been attributed partly to a concerted effort by the inshore fleet in recent years to avoid areas of high juvenile sole abundance, and/or to a temporary under-capacity of the fleet. Although the hake catch was slightly lower than in 1992, the relative importance of hake to the fishery increased slightly. This may be attributed to a change in species composition because of the lower horse-mackerel catch.

As with other directed trawl fisheries, utilization of the by-catch is an important component of the inshore trawl fishery (Table XXVII) and the proportion of many of these species in the total catch is increasing. However, by-catch is problematic when targeting on a species such as sole, which is a valued but small fraction of the total catch (unwanted by-catch reduces the catch rates of target species). Species such as panga, carpenter (silver), kob, gurnards and skate are valued by-catches and contribute substantially to the total inshore landings (Table XXVII).

3.14.3 MIDWATER TRAWL

COMPARED to bottom trawling the midwater trawl fishery is relatively small. In 1993, nine midwater permits were issued, each of the major trawling companies participating in the fishery and targeting exclusively on horse mackerel. Approximately 85% of the midwater catch of horse mackerel was made on the South Coast (about the same percentage as in 1992) with the highest catches and catch rates recorded on the eastern Agulhas Bank. The balance of the midwater catch (15%) is taken in an area extending from Cape Agulhas westwards towards Danger Point. The horse-mackerel catch by midwater gear (5 889 t) is still small in comparison with the total demersal horse-mackerel catch of 24 314 t (Table XXVII and Table XVIII). Although horse mackerel are abundant on the South Coast, their unpredictable behavioural patterns, which include horizontal and diurnal vertical migrations, make them difficult to catch at times. Small amounts of other species were also caught by the midwater fishery, but many of these declined in 1993 compared with the previous year. Bottom and midwater trawling are often done alternately by the same vessel, depending on the availability of horse mackerel.

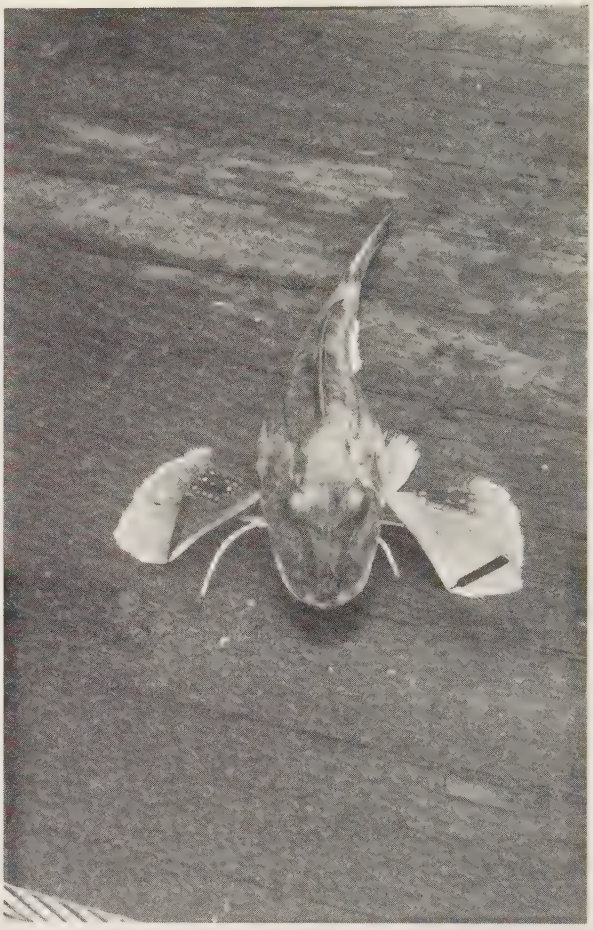
3.14.4 WEST COAST EXPERIMENTAL SOLE AND GURNARD FISHERIES

TWO small experimental fisheries, for which separate permits are issued, continued to operate on the West Coast in 1993. These operations are similar to those of the inshore fleet on the South Coast. Vessels are small and use 75-mm mesh nets. Two vessels operated out of Port Nolloth, targeting on the once abundant West Coast sole. The catch of West Coast sole in 1993 was 45 t (Table XXVII), compared with 134 t in 1992. Most of the effort was expended close inshore between the Orange River and Port Nolloth, with catches spread over most months of the year. There was a small by-catch of kingklip, St Joseph, skate, monk and horse mackerel.

Farther south, in the St Helena Bay area, three experimental trawling permits were issued in 1993, of which only two were utilized. The target species was the Cape gurnard, but an almost equal tonnage of St Joseph was also landed (107 and 103 t respectively — Table XXVII).

3.14.5 DEMERSAL SPECIES AND STOCKS

MOST effort on hake was directed at the well established trawling grounds on the West Coast, the southern and eastern Agulhas Bank and at those in areas close to the home ports of the trawling companies. The largest portion of the hake catches was made in three distinct areas. These included grounds south-west of Port Nolloth, a broad band between Cape Columbine and Cape Point and a small area due south of Cape Agulhas (Brown's Bank). Catches on the eastern Agulhas Bank (from Plettenberg Bay to Port Elizabeth) were higher than normal for that area. In general, availability of hake varies seasonally and this often dictates the fishing strategies of the trawling fleets. Weather and sea conditions, as well as market-related requirements also influence the time and areas fished.



Cape gurnard *Chelidonichthys capensis* on deck, a bottom-living fish that is good eating in spite of the bony armour on the head. Caught on handlines and as by-catch in bottom trawls, but recently the target of an experimental fishery on the West Coast

In 1993, the annual catch rate on the West Coast declined and, compared to recent years, areas of high catch rates (>3 t/h) were more fragmented and fewer (Fig. 6). The greater part of the West Coast hake catch was made by the deep-sea fleet in water deeper than 300 m, indicating that the deep-water hake was probably the dominant hake species caught. In contrast to the West Coast, the South Coast

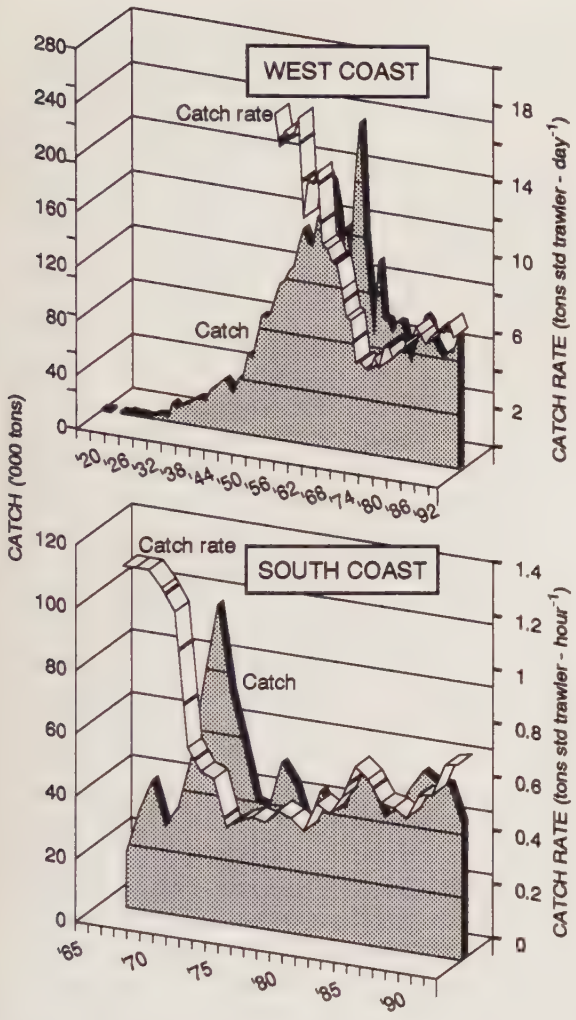


Fig. 6: Time series of trawl catches and catch rates of hake on the West and South coasts

catch rate was unchanged (Fig. 6). The areas fished there were also more varied in their depth distribution (and generally much shallower than on the West Coast), suggesting that a significantly higher proportion of the shallow-water hake was caught. Environmental patterns in late 1993 and early 1994 differed somewhat from the norm. Easterly and south-easterly winds were unusually strong and persistent, resulting in stronger upwelling on the West Coast and generally lower than average sea temperatures on the Agulhas Bank. It is believed that this was a major contributing factor to the poorer hake catch rates in 1993.

Pressure to exploit hake using handlines and longlines continued in 1993. Reported handline catches (274 t) were lower than in 1992. At present it is assumed that most of the inshore fleet's hake catch (8 870 t), as well as all catches on lines, consists of the shallow-water hake. Present scientific research on the hake stocks is concerned with the hake species composition and selectivity patterns of the present trawl fleet as well as of any future potential hake-directed longline fishery. For example, longline effort on the South Coast is likely to impact on the shallow-water hake and will significantly affect the assumptions now used in the assessment of the hake resource.

The debate on the advantages and disadvantages of trawling and line-fishing for hake continued in 1993. A successful workshop attended by all interested parties was held in order to facilitate an agreement regarding the initiation of an experimental longline fishery. An intensive one-year hake-directed pilot study will commence in 1994 with the intention of ascertaining with certainty the selectivity patterns of longlining. For the time being, however, indications are that the hake resource is slowly improving under the present harvesting strategy and the impact of the linefisheries will therefore have to be carefully monitored.

Catches of Agulhas sole increased slightly over the previous year. Entrepreneurs in the inshore fishery not only target on sole, but also hake and horse mackerel. Few boats target exclusively on sole. The highest sole catches in 1993 were in June/July and November/December in the Cape Infanta area. Catch rates of sole were also high on the eastern Agulhas Bank in the Port Elizabeth area where the larger fish are more abundant.

Operators continued to make an effort to avoid areas where small sole are abundant. It appears that the controlled exploitation of the Agulhas sole is having no adverse effect on the stock, but close monitoring will continue.

Horse mackerel was not as abundant as in the previous year on the South Coast, and it remains a difficult resource to utilize. Availability is unpredictable, the fish is difficult to process and markets are not yet fully established. For reasons already explained, stocks of horse mackerel are also not easy to assess. A major consideration is the source of recruitment of horse mackerel. Bay areas on the South Coast are known to support large numbers of juvenile horse mackerel, and these areas are closed to trawling. More importantly, stocks of juveniles on the West Coast are believed to be a major source of recruitment to the South Coast stock. Large numbers of juvenile horse mackerel were caught by the purse-seine fleet on the West Coast in 1993 and this may have had a detrimental effect on the recruitment to the fishery on the South Coast. On the other hand, the increased availability of juvenile horse mackerel on the West Coast could be an index of the possibility of good recruitment.

Other demersal stocks monitored closely included kingklip and gurnards. Kingklip is a difficult resource to assess as it comprises only a small (but valuable) by-catch in the hake-directed trawl fishery. Kingklip is furthermore found mostly over hard grounds inaccessible to trawlers. The kingklip by-catch is therefore used as an indicator of the state of the resource. Catches in 1993 continued their increasing trend since 1991, suggesting a possible slow recovery of the stock. It is, however, too soon to confirm this with absolute certainty. Another consideration is that any growth in a hake-directed linefishery will almost certainly impact further on the kingklip resource in a similar but perhaps less severe way as the longline experiment in the 1980s.

By-catch species are often neglected when assessing a targeted resource. Monk, for example, is an extremely valuable catch. The catch of this species has been around 5 000 t for several years, but fell to 4 280 t in 1993 (Table XXVIII). As more of the by-catch species are retained, the proportion of traditionally highly valued species in the catch, such as hake, will decrease. Buttersnoek (ribbonfish) are still being caught in large quantities (12 224 t in 1993) and the development of markets for this species has resulted in targeting. With the decreasing foreign effort, catches of panga have declined, and the species may therefore offer scope for directed utilization by South African companies. Other by-catch species are increasingly being retained by trawlers, whereas before they were normally discarded as trash fish. Species such as the red squids are retained when markets are good but otherwise discarded. This probably accounts for the small amount reported in 1993 (58 t) as opposed to 300 t in 1992.

Monitoring and sampling of the demersal fisheries continued in 1993. Greater efforts were again made to sample the size distributions of the different fish size categories used by the industry. In addition, regular monthly sampling on board commercial trawlers was done and the results from these trips were compared with direct information obtained from three research biomass surveys conducted each year. The quality of the data used in resource assessment is dependent upon log books obtained from the skippers who report on their day-by-day catches. Their estimates are balanced against the total landings recorded for each vessel after each trip. The demersal data base and the quality of the information contained therein are essential for the control and management of the fishery as well as for the correct sustainable utilization of the resources. The potential growth in the hake industry, with the possibility of a substantial linefishery, will make

maintenance of the system for data collection and capture increasingly difficult and is an ongoing task of those responsible for the demersal stocks within Sea Fisheries.

It is also expected that a major marine science initiative, involving both Sea Fisheries and other institutions will get off the ground during 1994, in which a major thrust will be towards demersal resources and their optimal utilization for the good of the whole population.

3.15 Seals

THERE was no seal harvest in 1993. A moratorium on seal harvesting was imposed by the Minister of Environment Affairs in July 1990. Further consideration of the sealing issue at Cabinet level awaits the submission of a report on research into biological interactions between seals and fisheries, which was recommended by the Hanks Committee (February 1991) and by the International Seal Workshop (September 1991). The scientific report is expected to be presented to the Minister during 1994.

The export of seal products in 1993 included 19 live seals to the following destinations: nine to England, three to Poland, three to Korea, two to Israel and two to Germany.

3.16 Guano

IN 1993, no seabird guano was collected at islands off South Africa or Namibia. This resulted from a need to review management objectives for islands and the impact of guano harvesting on seabird populations. The conservation status of a number of South Africa's seabirds has been of concern in recent years. In particular, the overall population of the African penguin, a species endemic to southern Africa, has continued to decrease at 20% per decade.

An amount of 643t was harvested at Bird Rock platform in the Walvis Bay enclave. In Namibia, 2 451 t was harvested at Swakopmund, 1 019 t at the central Cape Cross platforms and 90 t from the northern Cape Cross platforms. Therefore, the overall production of seabird guano in southern Africa in 1993 was 4 203 t.

At Swakopmund, 1 077 t was collected in 1992. This was not reported in the previous review, and brings the production of seabird guano in southern Africa in 1992 to 1 856 t. The production in 1993 was greater than this and may be compared with levels of 3 346 t in 1991, 3 497 t in 1990, 4 447 t in 1989 and 2 791 t in 1988.

At the end of February 1994, Walvis Bay and the guano islands off Namibia are to be transferred to Namibia.

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